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# THIRD VOLUME.

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# PART V.

## OF THE

# BLOOD-VESSELS.

OF THE

# *BLOOD-VESSELS IN GENERAL.*

THE BLOOD-VESSELS are divided into ARTERIES and VEINS.

## ARTERIES.

The *Arteries* are Elastic Canals, which convey the Blood from the Heart to the different parts of the Body, and are distinguished from the Veins by their Pulsation.

The original Trunks of the Arteries, or those which arise from the Heart, are two in number,—the *Pulmonary Artery* and *Aorta.* From these all the other Arteries are derived.

The Arteries are dispersed over the whole Body, and are every where surrounded with Cellular Substance.

The Principal Trunks run in such parts of the Body as are least exposed to danger, deriving support or defence from the Bones along which they pass.

The largest Arteries are in general deep-seated, while the smaller Branches run more superficially; on the contrary, many of the large Veins, particularly those of the Muscles, run directly under the Skin, while Veins of inferior size are found in the deeper parts of the Body.

The largest Arteries go to the *Viscera*, within the Great Cavities, the smaller ones to the *Skin* and *Muscles*, and those still smaller to the *Bones*, and, in certain places, they become so extremely minute as altogether to exclude the red Blood, carrying a colourless Fluid only.

The Arteries, when empty, are distinguished from the Veins, by the *whiteness* of their colour, and *thickness* of their Coats.

They are composed of different *Layers* or *Coats*, which are readily separated by Dissection.

In several parts of the Body, as in the *Posterior Mediastinum*, they are surrounded by a *Membrane* common to them and to the neighbouring Viscera.

In other parts of the Body, especially in young Subjects, they are surrounded with so much Cellular Substance, as to give them the appearance of being inclosed in *Sheaths*. This appears very evident about the Abdominal Aorta, and the great Arteries of the Arm, Thigh, &c.

The first of the proper Coats is the *External Membranous*, or *Cellular*, called also by some Authors the *Nervous Coat*.

In the large Arteries, this Coat is frequently furnished with *Fat*, and is of a very *elastic* nature. Owing to this elasticity, the Arteries, in receiving the Blood from the Heart, become dilated and elongated, and start from their place, which forms the *Pulse*, called also the *Diastole* of the Arteries.

The *Second*, or *Middle*, or *Muscular Coat*, is composed of Fibres running in a transverse direction,—of a pale red colour;—each Fibre appearing to form only the Segment of a Circle, although the whole constitutes a Cylinder round the Artery.

The Fibres of the Second Coat are closely compacted together, and formed into Layers, which can be separated from each other, especially in the Great Arteries, and still more particularly in those of large Animals.

By the contractility of this, and the elastic nature of the former Coat, the Arteries are enabled to drive the Blood to the Veins, in proportion as they receive it from the Heart;—and this Contraction is called the *Systole* of the Arteries.

The *Third*, or *Inner Coat*, is formed of a transparent Membrane, remarkably thin, smooth, and dense, by which the Blood is prevented from transuding.

The different Coats of the Arteries are connected to each other by fine Cellular Substance, which some Authors have considered as forming so many Lamellæ.

The Arteries are supplied with their own Blood-vessels, termed *Vasa Vasorum*, which come from the nearest small Branches, and are every where dispersed upon their external Surface.

They have also their *Lymphatics*, which on the large

Arteries, as the Aorta, are so numerous as sometimes to cover them.

They are likewise furnished with *small Nerves*, forming, in some parts of the Body, a Plexus, which vanishes in their external Coat.

There are no *Valves* belonging to the Arteries, excepting those which are placed at the Mouths of the Pulmonary Artery and Aorta.

Where the Arteries run a certain way without sending off Branches, they are observed to be of a *Cylindrical* form; but where Branches come off, their capacity is diminished, and this in proportion to the number of their Ramifications.

Wherever an Artery divides into two Branches, the Area of these two Branches, taken conjunctly, is found to be nearly one half larger than the Area of the Trunk from which they issue, though this has been differently stated by different Authors.

When the Trunk and Branches of an Artery are regarded collectively, they appear evidently of a *Conical* figure; the point of the Cone being formed by the Trunk, and the Basis by the Branches of the Artery.

The Section of the Arteries is circular;—when empty, they become flat, but recover their round form upon being distended by Injection.

The Angles at which the Branches go off from their Trunks vary in different parts of the Body; they are in general more obtuse or acute, in proportion to their vicinity to the Heart, and are such as are most favourable to the parts they have to supply.

In the Trunk of the Body, or where they belong to tender and delicate Viscera, the Angles are more obtuse,—in the Extremities they are more acute; the former circumstance tending to diminish, and the latter to increase, the force of the Blood.

The Arteries form many divisions and subdivisions, something like the Branching of a Tree, before they reach their Terminations, and at last become invisible to the naked Eye.

The divisions formed by any single Artery have been variously enumerated by different Authors,—one, in particular, reckoning them at forty, and another, of equal respectability, only at twenty; their number, however, is such as to allow them to supply the most minute parts of the Body.

The strength of the Arteries depends upon the thickness of their Coats, which is found to vary in different Arteries.—In the Aorta, the Coats are thick and strong:—in the Arteries of the Brain and Spleen, they are thin and tender;—but the thickness and consequent strength are proportionally greater in the small Branches than in the large Trunks.

The Arteries run more or less in a waving direction, which breaks the force of the Blood in them, and prevents them from being strained by the motions of the parts to which they belong.

The Flexions are most frequent in Arteries belonging to parts, the size and situation of which are changeable, as in the Lips, Uterus, &c.

The Windings of many of the Arteries are in proportion to the degree in which they are distended; those which are nearly straight in their natural state, frequently becoming serpentine when their distension is increased, as appears evident in many parts of the Body, when their Vessels are well injected.

Several of the large Arteries form communications with each other, termed by Anatomists *Anastomoses*; but the Anastomoses are more frequent among the small Branches, where they form a Plexus, which lessens the danger of obstruction.

In some parts, two Arteries unite into a Trunk; in others, they form an Arch, from the convex side of which other Arteries are sent off; and this may be repeated several times, the Arches and Arteries gradually becoming more diminutive in their size.

The Anastomoses are more frequent in the Skin and Membranous Parts. In the solid Viscera, the Arteries run in a different manner, being, in some, crowded together in the form of Trees or Bushes, in others having a serpentine appearance, and in several forming Penicilli, according to the disposition of the part.

The Arteries obtain their particular names from their situations, place of destination, &c.; and the term *Capillary*, as expressive of their smallness, is applied to their minutest Branches.

The Diameters of the different Trunks and Branches of the Arteries vary much in different parts of the Body; but those of the Capillaries are more nearly equal to each other.

The following is the manner in which the Arteries of the Body terminate, viz.

In Red Veins, as is observed by the assistance of the Microscope and by Injections:

In Glands or Follicles, by Secretory Ducts, which separate a Fluid from the general Mass of Blood:

In Exhalent Vessels, which discharge their Contents into the Internal Cavities, or upon the external Surface of the Body, to lubricate these;

In colourless or Lymphatic Branches, which are afterwards continued to the Circulating Veins, as in the Cartilages and Cornea.

In the Penis and Clitoris, the Arteries terminate in Cells.

The Use of the Arteries is,—

To convey Blood from the Heart to the different parts of the Body:

To assist in converting the Chyle into Blood:

To nourish the Body, and promote its growth:

To assist in preserving the Fluidity of the Blood, and the Heat and Life of the Body:

To form the different Secretions; and,

To renew the Growth of Parts destroyed by Accident or Disease.

## VEINS.

The *Veins* are elastic flexible Tubes, returning the Blood from the different parts of the Body to the Heart, —and have no Pulsation.

The *Coats* of the Veins are the same in number with those of the Arteries, but are thinner, denser, and less elastic when taken in a longitudinal direction, but the reverse when considered transversely. Their Coats, like those of the Arteries, are thicker, however, proportionally, in the small Branches than in the Trunks.

In the large Veins, as the Vena Cava, the Coats can be separated from each other; but in the small Branches their separation is difficult.

The *Muscular Coat* of the Veins being loose like Cellular Substance, much thinner, and more indistinct than that of the Arteries, has occasioned its existence to be denied by many Authors.

The Veins are also furnished with their *Vasa Vasorum*, similar to, and from the same source with those of the Arteries.

The *Colour* of the Veins is bluish, and when full of Blood, in consequence of their thinness, they appear of a purple tinge.

Their size is generally more than double that of the Arteries to which they belong; excepting the Pulmonary Veins, the size of which scarcely surpasses that of the corresponding Arteries.

In the Fleshy parts of the Body, particularly in the Extremities, they consist of *two Sets;* one *Deep-seated*, accompanying the Arteries, the other running immediately under the Skin, and termed *Subcutaneous*.

The Veins of the Thoracic and Abdominal Viscera generally accompany their Arteries; and the same is observeable in the small Branches belonging to Membranous parts.

The *Figure* of the Veins is similar to that of the Arteries; and, upon comparing the Area of their Trunks with the collective Area of their Branches, like them too, they are perceived to be Conical; the Base of the

Cone being formed by the Branches, and the Apex by the Trunks.

The size and number of the Veins is in general so much greater than that of their corresponding Arteries, that when the Vessels of a Membranous Part are distended by Injections of different colours, the Veins are observed in a great measure to conceal the Arteries: In the Intestines, however, the number of the Arteries and Veins is nearly equal.

There is much greater variety among the Trunks of Veins, with respect to situation and division into Branches, than is observable among the Arteries.

The variety in Nature, in this respect, is such, that the Veins of every Subject differ a little from those of another.

The Veins are capable of suffering greater distension than the Arteries, yet are more frequently ruptured.

The Anastomoses are greater and more frequent in Veins than in Arteries, the Blood being more in danger of an interruption in the former.

The Communications of the Veins are often by large Trunks, whereas those of the Arteries, excepting in a few places, are by small Branches only.

Where the Veins are exposed to Muscular action, they are furnished with *Valves*, which are Semilunar Folds continued from the inner side of the Vessels, and placed in pairs at irregular distances.

The Valves are concave towards the Heart, and, when closely applied to each other, represent a figure somewhat like that of the shut end of a Thimble.

Between the Valves and sides of the Veins next the

Heart, the Blood insinuates itself; and Cavities are formed, termed *Sinuses* of the Valves, which appear externally in the form of Varices.

The Valves are generally found in the Fleshy parts of the Body, but are chiefly situated in the Veins of the Extremities.

They are wanting in the Veins of the Deep-seated Viscera, viz. in those of the Brain and Spinal Marrow, in those of the Lungs, in the System of the Vena Portæ, and in those of the Kidneys, Bladder, and Uterus. They exist, however, in the Spermatic, and sometimes in the Internal Mammary Veins, and in the Branches of the Vena Azygos.

The Valves direct the Blood towards the Heart, and prevent Regurgitation. They are of such strength, and so nicely adapted to each other, as to prevent Injections after death from passing by the Trunks of the Vessels to their extremities.

The Veins convey the Blood from the extremities of the Arteries, with the Chyle and Lymph from the Absorbents to the Heart.

BLOOD.—The Blood has a Saponaceous feel, a Saline taste, a perceptible odour, and emits a Watery Halitus. When circulating through the Body, if it be exposed to the Microscope, it has the appearance of Globules diffused through a liquid.

When taken from the Body, and allowed to stand for some time, it separates into a Watery Fluid called *Serum*, and a Coagulum termed *Clot*, *Cruor*, or *Crassamentum*, of which there is commonly about three parts of the latter to one of the former. The Coagulum again is separable into a red Colouring Matter, or the *Red Globules* of the Blood, and *Gluten* or *Fibrin.*

The Serum is of a yellowish-green colour, slightly Alkaline, containing Muriate of Soda, and Phosphates of Soda and Lime, and, according to some, about 12 per cent. of Albumen.

The Crassamentum is of a dark red colour, acquiring, however, a more florid hue on exposure to the Air. When washed in Water, it is separated into the red Globules, and the Fibrin, which is of a white colour, and of an elastic and Fibrous nature.

The Colouring Matter is supposed to be composed of Albumen, Sub-phosphate of Iron, and perhaps Gelatin united with Soda. The existence of Iron, however, in the Blood, has been lately denied. The Fibrin is insoluble in Water, but is dissolved by Acids and Alkalis. Exposed to heat, it gives the usual Animal products.

*DISTRI-*

## *DISTRIBUTION OF THE BLOOD-VESSELS.*

### *Of the* PULMONARY ARTERY *and* VEINS.

THE *Pulmonary Artery,* nearly of the same size with the Aorta, arises from the Right Ventricle of the Heart, and ascends behind the Sternum, and within the Pericardium, inclining a little to the left side.

Having run as high as the concave side of the Arch of the Aorta, it divides into two Lateral Branches, which terminate in the Right and Left Lungs.

The Right Branch, which is the largest, passes behind the Curvature of the Aorta and the Superior Vena Cava, and is of course also the longer of the two.

The two Branches are dispersed throughout the Substance of the Lungs, by Ramifications which accompany those of the Bronchi, and, becoming gradually smaller, terminate upon the Pulmonary Cells.

From the extreme Branches of the Pulmonary Artery, the Blood is returned by corresponding Veins.

The *Pulmonary Veins* run contiguous to the Arteries, but, unlike the other Veins in general, are nearly of the same size with their Arteries.

In their course they unite into larger Branches, which, after leaving the Lungs, form four principal Trunks,—two from the Right, and two from the Left Lung, which, after perforating the Pericardium, terminate in the Left Auricle of the Heart, at its upper and lateral parts; of these Trunks one is Superior, and the other Inferior, on each side. The Superior passes before the corresponding Artery, the Inferior behind the Branches of the Trachea. The Trunks of the Veins of the right side, like their Artery, are longer than those of the left.

### *General Course of the* Aorta *and* Vena Cava.

The *Aorta* arises behind the Pulmonary Artery, from the upper and back part of the Left Ventricle of the Heart, opposite the third Vertebra of the Thorax, and sends off, at its Origin, the *Coronary Arteries,* formerly described.

Where it takes its Origin, it turns a little to the right, and is afterwards directed upwards, backwards, and towards the left side.

It ascends as far as the top of the second Dorsal Vertebra, under the name of *Aorta Ascendens,* and is afterwards reflected obliquely backwards over the Right Branch of the Pulmonary Artery, and Root of the Left Branch of the Trachea, till it reaches the third Vertebra of the Back, forming what is termed the *Curvature* or *Arch* of the Aorta.

It then commences *Aorta Descendens,* which runs down close upon the Spine, till it reaches the fourth

Vertebra of the Loins, where it divides into the *two Iliac Arteries.*

The Thoracic portion of the Aorta Descendens is situated on the fore and left part of the Spine, between the Layers of the Posterior Mediastinum.

Where it passes from the Thorax to the Abdomen, it goes between the long Crura of the Diaphragm, after which it descends more immediately upon the fore part of the Vertebræ.

The Aorta sends off Arteries which carry Blood to the different parts of the Body, from whence it is returned by Veins to the Inferior and Superior Venæ Cavæ, excepting what passes by the Coronary Vessels.

The *Inferior Cava* is formed by the union of the two Venæ Iliacæ, upon the last Vertebra of the Loins, a little below the termination of the Descending Aorta.

It is situated upon the fore part of the Spine, and at the right side of the Aorta, which it accompanies a considerable way through the Abdomen.

Near the upper end of the Abdomen, it recedes from the Aorta, and passes behind the large Lobe of the Liver.

It perforates the Diaphragm in its Tendinous part, and having entered the Pericardium, it goes immediately into the Right Auricle of the Heart.

The Inferior Cava receives the Blood from the Inferior Extremities, from the Pelvis and Abdomen, and carries it to the Heart.

The *Superior Cava*, formed by the union of the two great Venæ Subclaviæ, with the addition of the Vena Azygos,—is situated in the upper part of the Thorax, upon the right side of, and a little more anteriorly than, the Ascending Aorta.

It begins behind the Cartilage of the first Rib, somewhat higher than the Arch of the Aorta, and has at first a small inclination towards the right side.

After descending about an inch, it perforates the Pericardium, and having run nearly twice this space, it enters the Right Auricle opposite to the termination of the Inferior Cava.

The Superior Cava receives the Blood from the Head, Neck, Arms, and containing parts of the Thorax, and, like the Inferior Cava, carries it to the Heart.

## BLOOD-VESSELS OF THE HEAD, AND PART OF THOSE OF THE NECK.

### ARTERIES.

From the upper side of the Arch of the Aorta, *three Large Arteries* arise, which supply the Head, Neck, and Superior Extremities.

Of these three Arteries, one on the right side, termed *Innominata*, or *Communis*, soon divides into the *Right Carotid*, and *Right Subclavian Artery*.

The other two are the *Left Carotid*, and *Left Subclavian*, which come off in separate Trunks.

The above is the ordinary way in which the Carotids and Subclavians come off from the Aorta; but there is considerable variety in this respect in different Bodies. Sometimes there are two common Trunks from which these Arteries take their rise; at other times there are four original Arteries from the Aorta; and in some rare cases, the Right Subclavian comes off from the left end of the Arch of the Aorta, and passes behind the Trachea.

In some instances, the two Carotids come off from the Arteria Innominata.

### Carotid Arteries.

The Carotid, termed also Cephalic Arteries, after emerging from the Thorax, ascend upon the fore part of the Vertebræ, on each side of the Neck, between the Trachea and Internal Jugular Veins, and behind the Sterno-mastoidei, gradually receding from each other, and getting upon the fore part of the Longus Colli, and Rectus Capitis Internus Major, on each side.

In the Neck, they do not send off any Branches till they reach the top of the Larynx, where each, opposite to the Os Hyoides, though in some rare instances much lower, divides into *External* and *Internal Carotid Arteries*, the former supplying the upper part of the Neck and the outer parts of the Head, the latter the Brain.

In some very rare cases, the Common Carotid has been observed to divide suddenly into numerous small Branches.

## EXTERNAL CAROTID.

The EXTERNAL CAROTID, or PERICEPHALIC, sometimes termed Facial Carotid, is placed more anteriorly, and nearer the Larynx, than the *Internal*, which lies deeper, and is, at its root, the larger of the two.

The External, though smaller than the other, appears as a continuation of the common Trunk.

It runs up behind the Angle of the Lower Jaw, under the Digastricus and Stylo-hyoideus, towards the Temple, and in its passage before the Ear, is sunk deep in the substance of the Parotid Gland, which it supplies in its course, and is divided into the following principal Branches, viz. Laryngea Superior, Lingualis, Facialis, Pharyngea Inferior, Occipitalis, Maxillaris Interna, Temporalis.

## ARTERIA LARYNGEA SUPERIOR.

The ARTERIA LARYNGEA SUPERIOR, GUTTURALIS SUPERIOR, vel THYROIDEA SUPERIOR, comes off from the Root of the External Carotid, and sometimes from the top of the Common Carotid.

It passes downwards and forwards in a winding direction, under the Omo-hyoideus and Sterno-thyroideus, and sends

*Branches* to the Muscles under the Os Hyoides, and to the Bone itself, and Ligament connecting it to the Larynx:

Branches to the Sterno-mastoideus, Platysma Myoides, Jugular Glands, and Skin near the Larynx:

The *Laryngeal Branch,* which passes between the Os Hyoides and Thyroid Cartilage, to the Cartilages, Muscles, and Membranes peculiar to the Larynx. This Branch is sometimes sent off from the Trunk of the External Carotid.

The *Thyroid Branch,* which is the continuation of the Trunk, dispersed upon the Substance of the Thyroid Gland.

The Branches of the Laryngeal Artery communicate with their fellows on the opposite side; the Anastomoses of the Thyroid Branches, however, are small compared with the rest.

### ARTERIA LINGUALIS.

The ARTERIA LINGUALIS, is sent off immediately above the former:—It runs near the Pharynx, first forwards and upwards over the corresponding Cornu of the Os Hyoides, and under the Hyo-glossus, then in a direction towards the under and fore part of the Tongue:—It gives

A *Small Branch* to the Pharynx:

A Branch, termed *Ramus Hyoideus,* to the Muscles placed between the Tongue and Larynx:

The *Dorsalis Linguæ* to the Fauces, Amygdala, Epiglottis, and Pharynx:

The *Ramus Sublingualis,* which comes off under the middle of the Tongue, and is dispersed upon the Sublingual Gland and adjacent Muscles:—and

The *Ramus Raninus*, which is the principal Branch of the Lingual Artery, running at the under and lateral part of the Tongue, and terminating near its point.

### Arteria Facialis.

The Arteria Facialis, Maxillaris Externa, Labialis, vel Angularis, also runs forwards, and goes under the Stylo-hyoideus, and Tendon of the Digastricus. It perforates the Submaxillary Gland, mounts suddenly over the side of the Lower Jaw, at the under and fore part of the Masseter, from whence it proceeds in a tortuous manner to the Angle of the Mouth, between the Zygomatic and Buccinator Muscles, and then by the side of the Nose, towards the inner Corner of the Eye.

In this course, it sends the following Branches to the adjacent parts:

The *Palatina Inferior*, vel *Ascendens*, which runs upwards upon the side of the Pharynx, covered by the Stylo-hyoideus, to be dispersed, by a Superficial and a Deep Palatine Branch, upon the Muscles attached to the Styloid Process and Palate, and upon the Velum Palati and parts near it:

A *Branch* spread out by many Twigs upon the Tonsil, and reaching as far as the Tongue:

*Branches* to the Inferior Maxillary Gland:

*Small Branches* to the Root of the Tongue, to the Skin, Muscles, &c. near the Angle of the Jaw:

The *Arteria Submentalis*, which advances between the Platysma Myoides and Mylo-hyoideus, and also between the anterior Belly of the Digastricus, and the Base of the Lower Jaw, furnishing Branches to the Submaxillary Gland, the Skin, Mylo-hyoideus, Chin, and Under Lip :

A *Branch*, upon the outside of the Jaw, to the Masseter :

The *Labialis Inferior*, which arises a little higher than the former, and goes to the lower part of the Under Lip, inosculating with the corresponding Branch on the opposite side :

*Small Branches* dispersed upon the Buccinator, and communicating with others dispersed upon the Substance of the Cheek :

The *Coronaria Inferior*, which comes off near the Corner of the Mouth, sometimes from the Labialis Inferior :—and

The *Coronaria Superior*, larger than the former, to the Upper Lip, from whence Branches run to the under part of the Partition and Point of the Nose.

The Coronary Arteries run near the edges of the Lips, where, meeting with their fellows of the opposite side, they form an *Arteria Coronaria Labiorum.*

Frequently one or both Coronary Arteries are larger than ordinary, in which case those on the opposite side are proportionally smaller.

After sending off the Coronary Branches, the Facial Artery runs near the Wing and side of the Nose.

From this part of the Artery, Branches are sent forwards to the Nose, and outwards to the Cheek.

The Facial Artery is at last lost upon the parts about the inner Corner of the Eye, and middle of the Forehead.

### PHARYNGEA INFERIOR.

The PHARYNGEA INFERIOR, vel ASCENDENS, is a small Artery arising near the Lingual, and frequently from the root of the Occipital one.

After ascending some way between the Rectus Capitis Internus Major and Pharynx, it divides into Branches, which are dispersed upon the Pharynx, Fauces, and Base of the Skull, where some of them enter the large Foramina, and supply part of the Dura Mater.—From this Artery, Twigs are also sent to the Sterno-mastoideus, Nerves, and Conglobate Glands.

### ARTERIA OCCIPITALIS.

The ARTERIA OCCIPITALIS, arises from the back part of the External Carotid, and at its Origin is concealed by the other original Branches sent off from that Artery.

It runs over the beginning of the Internal Jugular Vein, which is exterior to the Carotis Interna. It afterwards passes between the Atlas and Mastoid Process, and is covered by the posterior Belly of the Digastricus.

It goes likewise behind the upper ends of the Trachelo-mastoideus, Splenius, and Complexus; after which it becomes more superficial, where it runs near the middle of the Occiput.

In its course it is very tortuous, and gives off different Branches to the surrounding Muscles, viz.

*Branches* to the Digastricus, Stylo-hyoideus, Sterno-mastoideus, and Glands of the Neck, and communicates with Branches of the Cervical Arteries:

*Another Branch*, which passes, with the Jugular Vein, and goes to the under and back part of the Dura Mater:

A *small Auricular Branch*, which is sometimes from the posterior Auricular, and is distributed on the Lobe and outer edge of the Ear:

The AURICULARIS POSTERIOR, which comes frequently off from the Trunk of the Carotid.—It sends Branches to the Parotid Gland, Digastricus, and Sterno-mastoideus, —a Branch to the Meatus Externus and Membrana Tympani,—the *Stylo-mastoid Branch*, which passes through the Foramen Stylo-mastoideum, giving Twigs to the Meatus Externus, Membrana Tympani, and to different parts of the Internal Ear.

The Auricular Artery passes afterwards behind the Ear, gives Branches to the Integuments, Muscles, and Bones there, and, creeping upon the back part of the Concha, sends Twigs to it, and terminates upon the side of the Head.

The Occipital Artery gives next a Branch, of considerable size, which descends between the Trachelo-mastoideus and Complexus, and afterwards gives Branches to most of the Muscles on this part of the Neck.

The Trunk of the Artery afterwards ascends in a serpentine manner upon the Occiput, dividing into several Branches, which are dispersed upon the Integuments and Occipito-frontalis, communicating with the

Occipital Artery of the opposite side, one Twig passing occasionally through the Foramen Mastoideum to the Dura Mater.

## ARTERIA MAXILLARIS INTERNA.

The ARTERIA MAXILLARIS INTERNA, which has its name in opposition to the Maxillaris Externa, goes off from that part of the Trunk which is covered by the Parotid Gland, and at its Origin lies behind the middle of the upright Plate which divides into the Condyloid and Coronoid Processes of the Lower Jaw.

It passes first between the Jaw and Pterygoideus Externus, and afterwards ascends, in a tortuous manner, towards the back part of the Antrum Maxillare, sending numerous Branches to the parts belonging to both Jaws.

At its Origin, it furnishes Twigs to the fore-side and adjacent parts of the Outer Ear, and to the Articulation of the Lower Jaw.

It then sends off the *Arteria Duræ Matris Media Maxima*, vel *Meningea Media*, vel *Spheno-spinalis*, which runs between the External and Internal Carotids, passes through the Foramen Spinale of the Sphenoid Bone, and spreads, like the Branching of a Tree, over the Surface of the Dura Mater and inside of the Parietal and Temporal Bones.

Before entering the Foramen Spinale, it sometimes gives Twigs to the Muscles and other parts near it. A minute Branch runs along the Inferior Maxillary Nerve to the Dura Mater; and within the Cranium, besides the Branches mentioned above, it furnishes Twigs to the Substance of the Bones, and to the inner Ear:

The *Inferior Maxillary* Branch, which runs in the Inferior Maxillary Canal, sending Branches to the Substance of the Bone, and to the Teeth; the remainder of it passing out at the Anterior Maxillary Foramen, is dispersed upon the Under Lip, communicating upon the Chin with Branches of the Facial Artery:

Branches to the Pterygoideus, Masseter, and inner part of the Temporalis, under the names of *Arteriæ Pterygoideæ*, *Massetericæ*, and *Temporales Profundæ:*

The *Arteria Buccalis* to the Buccinator and other parts of the Cheek:

The *Arteria Alveolaris*, which runs behind the Antrum, and sends Branches to the Gums and soft parts surrounding the Upper Jaw.—It sends other Branches which enter by small Holes to the Antrum, and to the Substance and Back Teeth of the Jaw; one of which is larger than the rest, and is the *Proper Alveolaris:*

The *Infra-orbitar*, which passes in the Canal under the Orbit, giving, at its entrance, Twigs to the soft parts in the bottom of that Cavity, and, in its progress, other Twigs to the Antrum, Substance of the Jaw, and Fore Teeth; after which it goes out at the Foramen Infra-orbitarium, and terminates on the Cheek, Upper Lip, and Nose, by several small Branches which communicate with those of the Facial Artery.

The *Palatina Descendens*, or *Palato-maxillary* Branch, which passes through the Foramen Palatinum Posterius,

rius, and runs between the Osseous and Fleshy parts of the Palate, supplying these with Branches; communicating with the Palatina Inferior, and frequently proceeding through the Foramen Incisivum to the inner part of the Nose:

The *Superior Pharyngeal*, which is a small Branch terminating in and about the upper part of the Pharynx, and Base of the Cranium near it:

The *Large Lateral Nasal*, or *Spheno-palatine*, which enters the Foramen Spheno-palatinum, and divides, at the upper and back part of the Nose, into many Branches, which supply the greater part of the inside of the Nose, viz. a Branch to the Posterior Ethmoid Cells, —a larger Branch to the Septum Narium,—a conspicuous Branch passing through the Spongy Bones to the Bottom of the Nose, furnishing Twigs to the Membrana SCHNEIDERIANA and Antrum Maxillare, and communicating with the Palato-maxillary Branch, which passes through the Foramen Incisivum.

### ARTERIA TEMPORALIS.

The Trunk of the External Carotid, having given off the Arteries already mentioned, emerges from the Substance of the Parotid Gland, then passes up between the Meatus Auditorius Externus and root of the Zygoma, to form the *Temporal Artery*, named also *Temporalis Externa*, vel *Superficialis*. From the root of this Artery are sent off *several Branches*, of unequal size, to the Parotid Gland: It next sends off,

The *Transversalis Faciei*, which arises nearly opposite to the Internal Maxillary, and proceeds transversely under the Zygoma, over the Masseter, and near the Parotid Duct. After giving Branches to the Parotid Gland, the Transversalis supplies a large portion of the Cheek, communicating with the Facial and Internal Maxillary Arteries.

The *Articular Artery*, which sends Branches to the Articulation of the Jaw, the External Meatus and Membrana Tympani, and penetrates through the Glenoid Fissure, as far as the Inner Ear, communicating with the Arteria Stylo-mastoidea:

The Deep *Temporal Branch*, sent off behind the Condyle of the Jaw, which penetrates the Aponeurosis of the Temporal Muscle, and ascends obliquely forwards to the outer part of the Orbit:

*Anterior Auricular Branches*, which come off near the Origin of the former Branch, and are ramified upon the fore part of the Ear, inosculating there with the Posterior Auricular Artery:

*Branches* to the Masseter, which communicate in the Cheek with the Facial and Internal Maxillary Arteries.

The Temporal Artery, having detached the Branches mentioned above, forms one or two sharp turns before the Ear; and a little above the root of the Zygoma, where the Pulsation of the Artery can be felt, and frequently even seen, it divides into two large Branches, an *Anterior* and *Posterior*, which are placed superficially between the Integuments of the Head and Aponeurosis of the Temporal Muscle.

The *Anterior*, *Internal Anterior*, or *Temporo-frontal Branch*, advances in a serpentine direction, spreading out its Ramifications upon the side and upper part of the Fore-head, some of which reach as far as the Orbit.

It supplies the Integuments and Muscles near it, communicates, about the Orbit, with the Facial Artery, and, at the upper part of the Head, with the corresponding Branch of the other side.

It occasionally gives a Branch from near its root, termed *Ramus Orbicularis*, which runs towards the outer Corner of the Eye, to be distributed upon the Orbicularis.

The *Posterior*, or *External Posterior*, or *Temporo-occipital Branch*, appears as the continuation of the Trunk. It ascends obliquely backwards, and is distributed extensively on the Integuments and Muscles upon the lateral part and Crown of the Head, communicating with the Anterior Branch, and with the Occipitalis on the same side of the Head, and also with the Posterior Temporal Branch of the opposite side,—from this and from the other Branches on the Head, numerous Twigs go to the Pericranium, and to the Substance of the Bone.

## Internal Carotid Artery.

The Internal Carotid, termed also *Arteria Cerebralis*, vel *Encephalica*, is arched back at its Origin, and then ascends in a waving direction, at the lateral and posterior part of the Pharynx, on the fore part of the Rectus Capitis Anterior Major, as far as the Foramen Caroticum, without giving off any Branches.

At the Base of the Cranium, it makes a sudden turn forwards, and enters the Carotic Canal of the Temporal

Bone. While in the Canal, it passes upwards and forwards like the Canal itself, and is surrounded by a considerable quantity of Cellular Substance and the Dura Mater, which form a Cushion between it and the Bone.

After leaving the Canal, it again bends upwards and then forwards, by the side of the Sella Turcica, and here it is situated within the Cavernous Sinus; and perforating the Dura Mater, at the root of the Anterior Clinoid Process, it is suddenly reflected obliquely backwards and upwards; after which it divides into Branches.

Through the whole of its course, it runs in a serpentine manner, which prevents the Blood in it from rushing too quickly and forcibly upon the tender Substance of the Brain. Contrary to the nature of other Arteries, the Internal Carotid is of a conical form, though it does not send off any Branches till it enters the Cranium.

While at the side of the Sella Turcica, it furnishes small Twigs to the Dura Mater and parts adjacent; as—a Branch which passes through the Pars Petrosa to the Tympanum,—a Branch termed *Posterior*,—and another termed *Anterior Artery* of the *Cavernous Sinus*, which go to the Dura Mater, Glandula Pituitaria, and Nerves at the side of it.

As soon as the Carotid perforates the Dura Mater, at the root of the Clinoid Process, it transmits the Arteria Ophthalmica.

## ARTERIA OPHTHALMICA.

The ARTERIA OPHTHALMICA is the principal Artery belonging to the Eye and its Appendages.

Immediately after it comes off from the Carotid, it enters the Foramen Opticum, and creeps under the Optic Nerve, included in the Dura Mater, towards the outer part of the Cavity of the Orbit.

After proceeding some way through the Orbit, it traverses its Cavity, between the Optic Nerve and Depressor Oculi, taking a spiral direction towards the Nose.

In this course, it first transmits *Filaments* to the Dura Mater and Substance of the Optic Nerve, and to the beginning of the Muscles in the bottom of the Orbit; after which it gives off the following Branches, viz.

The *Arteria Lacrymalis*, which runs at the outside of the Orbit, and is chiefly dispersed upon the Lacrymal Gland; some Threads advancing to the Eye-lids: one Twig goes to the Periosteum of the Orbit, and another through the Cheek-bone to the Face:

The *Arteria Centralis Retinæ*, which penetrates the Optic Nerve a little behind the Ball of the Eye, runs in the axis of the Nerve, and spreads out into many small Branches upon the inside of the Retina.

When the Nerve is cut across near the Ball of the Eye, the Orifice of the divided Central Artery is observable, which, before its nature was understood, was known by the name of *Porus Opticus*.

In the Adult, the Central Artery appears to terminate entirely upon the Retina; but in the Fœtus, after furnishing,

nishing, at the bottom of the Orbit, the Branches proper to the Retina, the Trunk is continued forwards through the axis of the Vitreous Humour, supplying its Cells and Membrane with delicate Filaments, and afterwards spreading out upon the back part of the Capsule of the Lens.

Its Branches are dispersed upon the Lens in a radiated manner, and, after surrounding it, some of them are sent forwards to the Membrana Pupillaris, as has been distinctly seen by the Author, after throwing in a fine Injection into the Ocular Artery previous to the seventh Month of Gestation:

The *Arteriæ Ciliares*, three or sometimes more in number, which divide into Branches running in a serpentine direction along the opposite sides of the Optic Nerve, and dividing into the Ciliares Breves, and Ciliares Longæ:

The *Ciliares Breves*, vel *Posteriores*, which are formed not only of Branches from the original Ciliary Trunks, but also of Twigs from the Muscular Branches, and are numerous. They perforate the Sclerotica, near the insertion of the Optic Nerve, give Twigs to that Coat, and, dividing into still smaller Branches, creep forwards upon the Tunica Choroides; forming many communications with each other as they advance, and retiring gradually from the convex to the concave surface of this Coat, to supply the Iris and Ciliary Processes.

The *Ciliares Longæ*, which seldom consist of more than two Trunks. They perforate the Sclerotica a little farther forwards than the former, pass along the Choroid Coat to its anterior part, and then each separates into two Branches, and these into others which inosculate round the outer edge of the Iris.

Besides the Ciliares Breves et Longæ, there is another Set, termed *Ciliares Anteriores*, which are a few Arterious Filaments from the Muscular Branches, entering the Eye where the straight Muscles are inserted.

At the root of the Iris, the different Sets of Ciliary Arteries unite into Arches, which form an irregular Circle, called *Circulus Iridis.*

From this Circle, many Arteries run upon the Iris in a radiated serpentine manner towards the Pupil, near which several of them also unite into Arches; and from these, Twigs are sent, along with the rest of the radiated Branches, to the inner edge of the Iris.—In the Fœtus, they are continued to the Membrana Pupillaris:

The *Muscularis Superior*, et *Muscularis Inferior*, which are dispersed upon the Muscles, Membranes, and Fat of the Eye; giving Twigs also to the Sclerotic Coat.

The *Ethmoidalis Anterior* et *Posterior*, two extremely small Twigs, especially the latter, which pass through the Foramina Orbitaria Interna,—Anterius et Posterius,—to the Bones and Membranes of the Nose, particularly to the Frontal, Ethmoid, and Sphenoid Sinuses, where they communicate with the Nasal Branches of the Internal Maxillary Artery.

The *Supra-Orbitalis*, vel *Frontalis*, which, after giving Branches to the Muscles and Periosteum at the upper and fore part of the Orbit, and to the Lacrymal Sac, emerges from the Socket, passes through the

Foramen Supra-orbitarium, and is divided into two parts;—one dispersed upon the Periosteum of the Fore-head, the other running to the Skin and Muscles on the Fore-head, and upper Eye-lid; and communicating with the anterior Branch of the Temporal Artery.

### ARTERIES OF THE BRAIN.

The Arteries of the Brain consist of the two *Internal Carotids*, and the two *Vertebrals*, all of which spread out their Branches upon the Pia Mater.

Each Internal Carotid, after sending forwards the Ocular Artery, gives a number of separate Twigs to the Optic Nerve, the Infundibulum, and the Choroid Plexus, and sends a particular Branch backwards to the Vertebral, termed *Arteria Communicans*, and then divides into two principal parts, the *Arteria Anterior*, and *Arteria Media Cerebri.*

### ARTERIA ANTERIOR CEREBRI.

The ARTERIA ANTERIOR CEREBRI, turns towards its fellow of the opposite side, and commonly sends Filaments to the First and Second Pair of Nerves.

A little before the union of the Optic Nerves, the right and left Anterior Cerebral Arteries become almost contiguous, and anastomose by means of a short, but large *transverse Branch*, and sometimes by two, which form part of that Communication of Vessels termed *Circus Arteriosus* WILLISII.

From this transverse Branch, but more frequently from the Anterior Cerebral Artery near it, a Branch is sent off, which passes into the Third Ventricle, and furnishes Twigs to the Septum Lucidum, and fore part of the Fornix.

The Anterior Cerebral Artery ascends upon the inner side of the Anterior Lobe of the Brain, nearly parallel to its fellow of the other side, and sends off a principal Branch, and commonly another soon after, both of which arch backwards upon the inner flat Surface of the Hemisphere.

The continuation of the Anterior Cerebral Artery is termed *Arteria Corporis Callosi*, and is reflected back upon the union of the Corpus Callosum and Hemisphere as far as the Posterior Lobe of the Brain.

The Branches of the Anterior Cerebral Artery are divided into minute Ramifications, which are first, through the medium of the Pia Mater, spread out upon the flat Surface of the Hemisphere, and afterwards upon its upper part.

The Ramifications form numberless Anastomoses with each other upon the Surface of the Brain, and then pass by minute Filaments into its Cortical and Medullary Substances.

Besides the Anastomoses of the different Branches of this Artery on the Surface of the Hemisphere, small Branches run across the Corpus Callosum, and inosculate with those of the opposite side.

### ARTERIA MEDIA CEREBRI.

The ARTERIA MEDIA CEREBRI,—termed also ARTERIA SYLVIANA, which is larger than the former,—runs outwards in a lateral direction through the *Fossa* of Sylvius, to the upper part of the Brain.

It gives first Filaments to the Optic Nerves, Glandula Pituitaria, and parts adjacent to it, and then divides into principal Branches; of which one Set go to the Anterior, and the other to the Lateral and part of the Posterior Lobe of the Brain.

From this Artery, one or two Twigs run up into the Anterior Cornu of the Lateral Ventricle, and assist in forming the Choroid Plexus of that Cavity.

Upon the outer Surface of the Brain, the Branches of this Artery, spread out upon the Pia Mater, inosculate with each other, and with those of the Anterior Cerebral Artery, and then plunge into the substance of the Brain, where they meet with the deep Branches of that Artery.

## Vertebral Artery.

The two *Vertebral Arteries*,—which are only a little smaller than the Internal Carotids,—arise from the Subclavian Arteries at the bottom of the Neck.

Each of them, at a small distance from its Origin, enters the Canal formed for its reception by the six uppermost Cervical Vertebræ, though in some rare instances it is seen entering the Seventh Vertebra, or sometimes only perforating two or three of the uppermost of these.

It ascends through the Neck, nearly in a straight direction, sending Twigs outwards between the Vertebræ to the deep Muscles of the Neck, and others which pass inwards by the Holes that transmit the Spinal Nerves, to the Spinal Marrow and its Membranes; communicating with the Spinal Arteries.

Immediately below the Head, it gives out more considerable Branches to the Deep Muscles at the back part of the Neck, particularly to the Recti and Obliqui Postici, the Trachelo-mastoideus, and Complexus; inosculating with Branches of the Occipital Artery.

One turn is formed upwards and outwards, in passing from the third to the second Vertebra; and another outwards and forwards, in going between the Vertebra Dentata and Atlas.

After perforating the Atlas, it bends suddenly backwards, and runs in a horizontal direction in a Notch upon that Bone.

Having reached the Foramen Magnum Occipitis, it turns upwards, perforates the Dura Mater, and enters the Cavity of the Cranium.

After entering the Cranium, it passes, with the Medulla Oblongata, upon the Cuneiform Process of the Occipital Bone, inclining towards its fellow on the other side; and at the beginning of the Medulla, the two Vertebrals unite into the Trunk called *Basilar Artery*.

Upon entering the Skull, each Vertebral Artery sends a small Branch, termed *Arteria Meningea Posterior*, to the back part of the Dura Mater, which communicates by small Ramifications with the other Arteries of this Membrane.

It then disperses Twigs to the Medulla Oblongata,

and

and frequently gives off the small Branch which forms one of the *Posterior* Arteries of the Spinal Marrow.

Near the part where it unites with its fellow, it sends down the *Anterior* Artery of the Spinal Marrow, which, with the Posterior Arteries of this Substance, will be afterwards described.

### ARTERIA POSTERIOR CEREBELLI.

From the Vertebral, or from the Basilar, or sometimes from each, a principal Branch is sent off, named *Arteria Cerebelli Posterior* vel *Inferior*, which passes between the Cerebellum and Medulla Oblongata, and furnishes Branches to the under part of the Cerebellum, to the back part of the Medulla Oblongata and Tuber Annulare, and forms the Choroid Plexus of the fourth Ventricle.

### BASILAR ARTERY.

The BASILAR ARTERY runs along the middle of the Tuber Annulare, which it slightly impresses, and lies upon the Cuneiform Process of the Os Occipitis; having there the Dura Mater and Tunica Arachnoidea between it and the Bone.

From the sides of this Artery numerous Filaments run transversely, to be dispersed upon the Tuber and adjacent parts.

One Branch, larger than the rest, called *Auditoria Interna*, passes between the two portions of the Seventh Pair of Nerves to the Internal Organ of Hearing.

At the extremity of the Cuneiform Process of the Occipital Bone, and at the upper and fore part of the

Tuber Annulare, the Basilar Artery divides into four principal Branches, two to each side; and these go off almost at right angles from the Trunk, viz. the Anterior Cerebelli, and Posterior Cerebri.

### ARTERIA ANTERIOR CEREBELLI.

The ARTERIA ANTERIOR, vel SUPERIOR CEREBELLI, turns round the Crura Cerebri, expands its Branches upon the upper part of the Cerebellum, and sinks into its Substance, supplying also the Walls of the Fourth Ventricle, the Nates, Testes, and parts near them:

### ARTERIA POSTERIOR CEREBRI.

The ARTERIA POSTERIOR, vel PROFUNDA CEREBRI, sends Twigs to the Tuber and to the Crura Cerebri, and unites with the internal Carotid, by the Arteria Communicans.

It supplies also parts lying near the Third Ventricle, and afterwards turning round the Crura Cerebri, passes backwards between the Cerebrum and Cerebellum.

It distributes its numerous Branches chiefly to the Posterior Lobe of the Brain, one Branch in particular penetrating into the Posterior Cornu of the Lateral Ventricle, and, with Branches of the Internal Carotid, forming the Arterious part of the Choroid Plexus.

The Branches of this Artery anastomose with those of the anterior part of the Internal Carotid, at the inside of the Hemisphere,—and with those of the lateral part of that Artery, at the outside of the Hemisphere, in the manner these do with one another in the other parts of the Brain:

### ARTERIA COMMUNICANS.

The ARTERIA COMMUNICANS unites the posterior Cerebral Branch of the Vertebral Artery to the Trunk of the Internal Carotid, and is nearly of the same diameter, but longer than the Transverse Artery which connects the anterior Branches of the Internal Carotid.

It runs by the sides of the Sella Turcica, sends minute Threads to the Crura Cerebri, to the Corpora Albicantia, Optic Nerves, and Infundibulum, and contributes to the formation of the *Circle* of WILLIS,—or that kind of communication by which the Blood or Injected Matter can pass readily across from one Internal Carotid to the other,—or from these backwards to the Basilar Artery.

The Circle of WILLIS incloses the Optic Nerves, the Infundibulum, and the Corpora Albicantia, and is of an irregular, or somewhat quadrangular figure, the size varying in length, not only in different Subjects, but in the different sides of the same Body.

### VEINS OF THE OUTER PART OF THE HEAD, AND OF PART OF THE NECK.

The smaller Veins which return the Blood from the Arteries of the outer part of the Head, and of part of the Neck, have a similar course with their corresponding Arteries; they unite into the following Trunks, viz.

The *Frontal Vein*, which is formed by several Branches belonging to the Muscles and Integuments on the upper and fore part of the Cranium, and which is often single, returning the Blood from both sides of the Forehead.

The *Facial Vein*, which is formed by the Frontal Vein, and by an intricate Plexus of Branches upon the Face.

It winds obliquely downwards and outwards, at a distance from the Artery; but, in crossing the Jaw, it goes close by the outside of it, and terminates in the External Jugular Vein.

The *Temporal Vein*, formed by Superficial and Deep Branches from the sides and upper part of the Head, and running down upon the Temple, at some distance from the Artery.

The Branches of the Temporal Vein form large Anastomoses; before, with those of the Frontal Vein; above, with their Fellows on the other side; and behind, with the Branches of the Occipital Vein.

The Trunk descends at the fore part of the Ear, and, along with the Artery, sinks in the Substance of the Parotid Gland.

In its descent before the Meatus Auditorius Externus, it receives Branches from the Ear, Parotid Gland, and Cheek, corresponding with those sent to these parts from the Carotid or Temporal Artery.

At the under part of the Angle of the Lower Jaw, the Facial and Temporal Veins commonly unite and form the *External Jugular*.

### External Jugular Vein.

The External Jugular Vein receives the following Branches at the upper part of the Neck, viz.

*Branches* of the Internal Maxillary Vein, the principal Branches of that Vein terminating in the Internal Jugular:

The *Lingual Vein,* which more frequently terminates in the Internal Jugular:

Some *Branches* from the Occipital Vein, the rest passing to the Internal Jugular and Vertebral Veins, and sometimes also communicating by a Foramen Mastoideum with the Lateral Sinus.

The Trunk of the External Jugular Vein descends in the Neck between the Platysma Myoides and Sterno-Mastoideus, receives in its course Branches from the adjacent parts, and terminates in the Subclavian Vein.

In the formation and termination of this Vein, there is great variety in different Subjects.

It frequently happens that most of the Ramifications, which commonly run from the Face and Throat into this Vein, go to the Internal Jugular.

Often the Facial Vein goes into the Internal Jugular, and the Temporal continued forms the External Jugular.

Sometimes one of the External Jugulars terminates in the usual way, and the other in the Internal Jugular.

In some rare cases, the External Jugulars have both been found terminating in one side of the Neck.

Besides the Vein commonly called External Jugular, a small Subcutaneous Vein, termed *Anterior External Jugular,*

*Jugular*, descends in the fore part of the Neck, receiving Branches from the adjacent parts, and terminating in the Subclavian Vein.

## VEINS OF THE EYE AND ITS APPENDAGES.

The Blood sent to the Contents of the Orbit is returned partly to the Facial Vein at the inner Corner of the Eye, but chiefly to the proper Ocular Vein, which terminates in the Cavernous Sinus by the following Veins, viz.

The *Vena Centralis Retinæ*, which is formed by many small Branches expanded upon the inner Surface of the Retina along with those of the corresponding Artery.

The Vena Centralis enters the Optic Nerve, where the Artery leaves it; and a little behind the Ball of the Eye, emerges from the Nerve, and runs between it and the Sheath which covers it; receiving many Twigs from the Nerve and its Membranes.

It passes afterwards under the Fasciculus of Nerves which belongs to the Eye, and terminates sometimes in the Ocular Vein, but, in general, directly in the Cavernous Sinus.

From the Iris and Choroid Coat, the Blood is returned by the *Short* or *Anterior Ciliary*, and by the *Long* or *Posterior Ciliary Veins*, and also by a principal Set of Ciliary Veins, termed *Vasa Vorticosa*.

Small Veins return from the Iris, which go under the Arterious Circle to the Veins of the Choroid Coat, and communicate with each other;—but without forming

ing any Circle such as is found in the Eyes of Oxen, and which corresponds, in them, with the Arterious Circle.

The *Short Ciliary Veins* pass from the Iris through the Sclerotic Coat, near the same part where the Anterior Ciliary Arteries enter.

The *Long Ciliary Veins*, like the Arteries, are commonly two in number, and of a smaller size than the Vorticose Veins.

They run from the Iris backwards along the Choroid Coat, communicate in their passage by minute Branches with the Vorticose Veins, and afterwards perforate the Tunica Sclerotica behind.

The *Venæ Vorticosæ* are numerous, and obtain their name from the Whirls composed by their Branches; the course of which has been compared to a *Jet d'Eau*, or to the Spiral Ridges upon the points of the Fingers, &c.

Of these Veins, four, or sometimes five, are by much the most conspicuous; the rest being smaller, and having less of the Vorticose appearance.

The Branches of each of the four principal Venæ Vorticosæ run in a close Congeries, unite at acute angles into larger Branches which have a curved direction, and these proceeding from all sides, meet in a point, and form the Trunk of the Vein.

The Trunks of these Venæ Vorticosæ, thus placed in the centre of their respective Whirls, are situated at the opposite sides of the Eye, and perforate the Sclerotic Coat obliquely near its middle.

The rest of the Venæ Vorticosæ, or smaller Ciliary

Veins, communicate with the adjacent larger Vorticose Veins upon the Surface of the Choroid Coat, and also perforate the Sclerotica near its middle.

After piercing the Sclerotica, the Vorticose Veins receive a number of minute Twigs which paint the Cellular Substance covering the Surface of the Sclerotica.

The Ciliary Veins run in a Serpentine direction at the opposite sides of the Eye, and pass, either separately, or united with other small Veins in the Orbit, into the Trunk of the Ocular Vein.

The other Venous Branches within the Orbit correspond in a great measure with their respective Arteries. They consist of—

*Branches* from the Palpebræ and inner Corner of the Eye:

The *Lacrymal Branch :*

The *Ethmoidal Branches :*

*Muscular Branches,*—and *Branches* from the Fat in the Orbit, and from the Membranes lining it.

The different Branches from the Eye and its Appendages form, by their union, the *Ocular Vein,* which greatly exceeds the size of the corresponding Artery.

The *Ocular Vein* forms large Anastomoses with the Facial Vein, at the inner Corner of the Eye, and afterwards passes back at the inner side of the Orbit.

From the inner, it goes across to the outer side of the Orbit, under the Levator Oculi; and, after running backwards through the Superior Orbitar Fissure, covered by the Third and Sixth Pair of Nerves, it terminates in the Cavernous Sinus.

VEINS

### VEINS OF THE DURA MATER CORRESPONDING WITH ITS ARTERIES.

The *Veins of the Dura Mater* accompany their Arteries, and run at each side of them. They go partly through the perforations in the Base of the Cranium, to terminate in Branches of the External or Internal Jugular Veins.—The rest pass into the nearest Sinuses of the Brain.

### VEINS OF THE BRAIN.

The smaller Veins of the Brain accompany the Arteries. Their Trunks run chiefly between the Circumvolutions of the Brain, at a distance from the Trunks of the Arteries.

They terminate in the different *Sinuses* of the Dura Mater, and generally in an oblique direction, which prevents the Blood from returning from the Sinuses into them.

The Sinuses most commonly found are the following:

The *Superior Longitudinal Sinus*, which begins at the under part of the Spine of the Frontal Bone,—runs along the upper edge of the Falx, and, becoming gradually wider, terminates upon the middle of the Occipital Bone, in the two Lateral Sinuses.

It receives the Blood from the upper part of the Brain by several large Venous Trunks, which enter it obliquely, forwards:

The *Torcular Herophili*, or *Fourth* Sinus of the Ancients,

cients, chiefly formed by the Vena GALENI, which returns the Blood from the Choroid Plexus, Corpora Striata, Septum Lucidum, and other internal parts of the Brain.

The Torcular passes back in the joining of the Falx and Tentorium, and terminates, along with the Superior Longitudinal Sinus, in the beginning of the Lateral Sinuses:

The *Inferior Longitudinal Sinus*, a remarkably small one, situated in the under edge of the Falx.—It receives Branches from that Membrane, and from the Corpus Callosum and parts of the Brain near it, and terminates in the beginning of the Torcular HEROPHILI.

The *two Lateral Sinuses*, or *Second* and *Third* Sinuses of the Ancients, formed by the Longitudinal and Torcular Sinuses.

They run at the Posterior Edge of the Tentorium along the Lateral Ridges of the Os Occipitis, as far as the Base of the Petrosal Processes of the Temporal Bones, from whence they wind downwards, pass through the Foramina Lacera common to the Occipital and Temporal Bones, and form the Internal Jugular Veins.

Frequently one of the Lateral Sinuses is formed by the Longitudinal, and the other by the Torcular Sinus; in which case, the one is found larger than the other.

The Lateral Sinuses receive Veins from the Cerebellum, and from the under and back part of the Cerebrum. They likewise receive the following small Sinuses, situated under the Brain, viz.

The *Circular Sinus* of RIDLEY, which is placed about the Glandula Pituitaria, and frequently surrounds it completely; receiving the Blood from it, and from the adjacent Bones and Membranes, and terminating in the Cavernous Sinuses.

The *Cavernous Sinuses*, which are situated at the sides of the Sella Turcica, and receive Blood from the Veins lying near the lateral Branches of the Internal Carotid Arteries, from the Ocular Veins, and from the Circular Sinus of RIDLEY.

The Cavernous Sinuses surround the Carotid Arteries and Sixth Pair of Nerves, and have a Cavernous Structure within, somewhat resembling that of the Penis.

The *Superior Petrosal Sinuses*, situated upon the Ridges of the Partes Petrosæ.

They receive some small Veins from the Dura Mater and Base of the Brain, and communicate backwards with the Lateral, and forwards with the Cavernous Sinuses.

The *Inferior Petrosal Sinuses*, placed at the roots of the Partes Petrosæ.—They receive the Blood from the Cavernous, and discharge it into the ends of the Lateral Sinuses.

Besides the Sinuses mentioned above, the following also are frequently met with, viz.

A *Perpendicular Occipital Sinus*, situated in the Falx Cerebelli, which is sometimes single, at other times double, and terminates in the Lateral Sinuses.—It receives Veins from the Dura Mater, and communicates with the Vertebral Veins.

The *Anterior Superior*, and *Anterior Inferior Occipital*

*pital Sinuses*, placed over the Cuneiform Process of the Occipital Bone, and communicating with the Inferior Petrosal and Lateral Sinuses, and with the Vertebral Veins.

### INTERNAL JUGULAR VEIN.

The Lateral Sinuses, having received the Blood sent to the Brain from the Carotid and Vertebral Arteries, pass out of the Cranium, and form the *Internal Jugular Veins*, each of which, at its Origin, is bulged back in form of a Varix, which is termed *Diverticulum*; and this is lodged in a Fossa at the root of the Pars Petrosa of the Temporal Bone.

The INTERNAL JUGULAR VEIN descends behind the Sterno-mastoideus, upon the fore and outer part of the Common Carotid Artery, with which it is included in a Sheath of Cellular Substance; and is frequently a good deal dilated towards its under extremity, especially in persons advanced in life.

In its course in the Neck, it receives, either by separate Branches, or some of these collected into Trunks,

*Branches* from the Pharynx and Muscles adjacent to it:

The *Internal Maxillary Veins*, with their Branches, termed *Meningeal*:

One or more *Branches* from the Occiput:

The *Lingual Vein*, which sometimes terminates in the External Jugular.—One Branch of this, termed *Ranina* from its complexion, is seen under the Tongue, and is that Vein which is opened in Venesection here:

The

The *Superior Laryngeal*, and now and then the *Inferior Laryngeal*, which more frequently goes into the Subclavian, or to the top of the Cava.

The Internal Jugular also receives *Branches* from the Muscles of the Neck, and at length terminates in the Subclavian Vein.

# THE REMAINING BLOOD-VESSELS OF THE NECK, WITH THOSE OF THE SUPERIOR EXTREMITY IN GENERAL.

## ARTERIES.

### SUBCLAVIAN ARTERY.

The Subclavian Artery has been already observed to arise, on the right side, in common with the Carotid, by a Trunk called *Arteria Innominata ;* and on the left, to come off directly from the Aorta.

### ARTERIA INNOMINATA.

The ARTERIA INNOMINATA, seu ANONYMA, named also *Right Subclavian,* scarcely two inches in length, ascends obliquely over the Trachea, at the right side of which it divides into the *Right Proper Subclavian,* and the *Right Common Carotid.*

The *Left Subclavian* arises from the Arch of the Aorta, at the outside of the Carotid, and ascends to the upper part of the Thorax; forming there a sharper curve than the Subclavian of the Right side, and advancing till upon a level with the first Rib, before it gives off any Branches.

After the two Subclavians have emerged from the Thorax, each passes transversely outwards at the under part of the Neck, behind the Origin of the Sterno-mastoideus, and continues its course, first between the anterior and middle Scaleni, and then between the Subclavian Muscle and first Rib.

After crossing the first Rib, it goes under the Pectoral Muscles to the Axilla, where it obtains the name of *Axillary Artery.*—In this course, it sends off the following Branches, viz.

The *Vertebral*;—the *Internal Mammary*;—and the *Superior Intercostal.*—The first of these has been already described; the two others belong to the inner part of the Thorax. It also gives off the *Thyroidea Inferior*, *Cervicalis Anterior*, *Cervicalis Posterior*, and *Dorsalis Scapulæ Superior.*

### THYROIDEA INFERIOR.

The THYROIDEA, vel GUTTURALIS INFERIOR, arises at the outer side of the Vertebral Artery, previous to the passage of the Subclavian under the Scalenus. It ascends obliquely inwards in a winding manner behind the Carotid Artery, gives Branches to the Trachea, which descend into the Thorax; also Twigs to the Larynx, Pharynx, and Esophagus; while the most considerable part of the Artery is dispersed upon the Thyroid Gland, inosculating with the Laryngea Inferior.

### CERVICALIS ANTERIOR.

The CERVICALIS ANTERIOR frequently comes off from the root of the Inferior Thyroid. It ascends behind the Sterno-mastoideus, furnishing Superficial Branches to the Muscles which go from the Trunk of the Body to the Neck, and Deep Branches to the Glands, Nerves, &c. lying on the fore and lateral parts of the Cervical Vertebræ.

The Deep Branches anastomose with the Vertebral and Occipital Arteries; and some passing through the Intervertebral Holes where the Nerves come out, communicate with the Spinal Arteries.

### CERVICALIS POSTERIOR.

The CERVICALIS POSTERIOR arises in common with the Anterior Cervical, or with the Inferior Thyroid.—This is larger than the former, lies farther out, and runs in a winding direction outwards and upwards.

It supplies the Skin and Muscles at the lateral and back part of the Neck, communicates with Branches of the Occipital, Vertebral, and Anterior Cervical Arteries, and sends a principal Branch downwards to the parts about the top of the Shoulder, and the upper and lateral parts of the Thorax.

### DORSALIS SCAPULÆ SUPERIOR.

The DORSALIS SCAPULÆ SUPERIOR, sometimes called *Transversalis*

*Transversalis Humeri*, comes frequently from the root of the Thyroid, and runs transversely behind the origin of the Sterno-mastoideus, near the Clavicle. It afterwards perforates the Notch in the Superior Costa of the Scapula, and, expanding its Branches upon the Dorsum of that Bone, supplies the Spinati and other Muscles situated there, and likewise furnishes Branches to the Joint of the Shoulder.

Besides the Branches of the Subclavian Artery mentioned above, others are frequently found, which are more variable in their origin, and in their distribution in the Neck; coming off occasionally from the Trunk of the Subclavian Artery, or, at other times, from some of its Branches already described.

### AXILLARY ARTERY.

The AXILLARY ARTERY, lying in the Axilla, between the Subscapularis and Serratus Major, is merely a continuation of the Subclavian. It is surrounded by the Lymphatic Glands and Fat, by the Veins, and also by the large Nerves which form the Brachial Plexus. It gives some small Branches to the adjacent Muscles and Nerves; but its principal Branches are, the Thoracicæ Externæ, Scapularis Interna, and the Circumflexæ.

### THORACICÆ EXTERNÆ.

The THORACICÆ, vel MAMMARIÆ EXTERNÆ, three or four in number,—are by some Authors described under particular names; as,

The *Thoracica Superior*, which arises opposite the first or second Rib, gives Branches to the Serratus and Intercostales, and to the Pectorales and Skin:

The *Thoracica Longa*, vel *Mammaria Externa*, which sends Twigs to the Axillary Glands; but goes chiefly to the Serratus, Pectoralis Major, Mamma, and Integuments, and inosculates with Branches of the Thoracica Superior:

The *Thoracica Humeralis*, vel *Acromialis*, which goes off opposite the Thoracica Superior, and divides suddenly into Branches, which run to the upper part of the Thorax near it, and to the Integuments, Muscles, and Ligaments, surrounding the Articulation of the Humerus; inosculating with Branches of the Scapulary Arteries:

The *Thoracica Axillaris*, vel *Alaris*, which, when present, goes off from, or near to the Thoracica Humeralis, and is bestowed upon the Axillary Glands, Fat, &c. frequently dispersing Branches upon the under edge of the Subscapularis, and upon the Pectoralis and Serratus.

The External Thoracic Arteries are frequently found to correspond with the description given above; but it may be at the same time noticed, that they vary much in their number, origin, course, and termination, in different Individuals. In general, however, they come off from the Axillary Artery, by Branches separate or united, and supply the parts about the top of the Shoulder, and upper, outer, and lateral parts of the Thorax; anastomosing above with the Arteries of the Neck, and below with those belonging to the containing parts of the Chest, and to the Upper Arm.

### SCAPULARIS INTERNA.

The SCAPULARIS INTERNA, vel SUBSCAPULARIS, vel SCAPULARIS COMMUNIS, which is the largest of the Axillary Branches, arises at the under edge of the Subscapularis Muscle, and soon divides into the proper *Scapularis Interna*, and the *Dorsalis Scapulæ Inferior:*

The SCAPULARIS INTERNA, strictly so called, runs near the inferior edge of the Scapula, and sends off many large Branches, the principal part of which are dispersed upon the Latissimus Dorsi, Teres Major, and Subscapularis. It sends Branches also to the Muscles arising from the Coracoid Process, to the Capsular Ligament, and to the Axillary Glands, which have large Anastomoses with each other, and with the Superior Dorsal Artery of the Scapula.

The DORSALIS SCAPULÆ INFERIOR, vel CIRCUMFLEXA SCAPULARIS, immediately after leaving the Internal Scapulary Artery, turns round near the Cervix of the Scapula, between the Inferior Costa of the Bone and the Teretes Muscles, to the Fossa Infra-spinata.

Upon the Posterior Surface of the Scapula, it spreads out into Branches of considerable size, which are dispersed upon the Muscles covering the under and back part of the Bone, and extend also to the Capsular Ligament; while the Trunk, ascending, inosculates with that of the Superior Dorsal Artery of the Scapula, whereby an Arch common to the two Arteries is formed under or at the root of the Acromion.

### ARTERIÆ CIRCUMFLEXÆ.

The Circumflex Arteries are two in number, one termed *Anterior*, the other *Posterior*.

The CIRCUMFLEXA, vel ARTICULARIS ANTERIOR, is sent off between the Subscapularis and Teres Major. It passes in a transverse direction between the Heads of the Coraco-brachialis and Biceps, and Body of the Os Humeri, immediately below the Joint of the Humerus. It is dispersed upon the Muscles which cover it, and upon the Periosteum and Capsular Ligament of the Joint; anastomosing with Branches of the Dorsalis Scapulæ Inferior.

The CIRCUMFLEXA, vel ARTICULARIS POSTERIOR, arises directly opposite to the former, and is by much the larger of the two.

It passes first between the Subscapularis and Teres Major, and then turns round between the back part of the Os Humeri, and Long Head of the Triceps, and the Deltoides. It sends Branches to the Periosteum and Joint, to the Short Head of the Biceps and Coraco-brachialis, to the two Tereti, to the Triceps and Subscapularis, and runs in a circular manner to the Deltoides, upon which it is chiefly dispersed. Its extreme Branches anastomose with those of the Anterior Circumflex Artery, so as completely to encompass the Body of the Bone. It inosculates also with the Branches of the Dorsalis Scapulæ Inferior.

Though the above is the common origin of the Circumflex Arteries, it frequently happens that they come off from the Humeral Artery; or one rises from the

Axillary, and the other from the Internal Scapulary; or they frequently come off by a common Trunk.

After giving off these different Branches, the Axillary Artery emerges from behind the edge of the Pectoralis Major, and runs along the Os Humeri, where it is termed *Humeral* or *Brachial Artery.*

### HUMERAL ARTERY.

The HUMERAL, or BRACHIAL ARTERY, which is a continuation of the Axillary one, descends at the inner part of the Arm, between the Tendons of the Latissimus Dorsi and Pectoralis Major, and behind the internal edge of the Biceps. It is covered by the general Aponeurosis, and has the Triceps Extensor Cubiti and Brachialis Internus at the back part of it. In this course, it bestows Branches to the Muscles and Integuments, and to the Periosteum and Bone, viz.

A *Branch* under the Coraco-brachialis to the Capsule of the Joint and parts adjacent to it:

*Branches* to the Triceps and Coraco-brachialis:

*Various Branches* to the Biceps, Brachialis Internus, and Bone.

*Three Branches,* more conspicuous than the rest, viz. the Profunda Humeri, Profunda Inferior, and Ramus Anastomoticus Magnus.

### PROFUNDA HUMERI.

The PROFUNDA HUMERI, vel SPIRALIS, arises near the upper part of the Arm, at the insertion of the Latissimus Dorsi and Teres Major, but sometimes has its origin from the Scapularis Interna, or from the Articularis Posterior, and in some very rare cases, is of great proportional size. It takes a spiral direction downwards and outwards, between the Triceps and Bone, and terminates at the outer Condyle of the Os Humeri, by a *Large communicating Radial*, or *Profundo-radial* Branch:

The Arteria Profunda sends Branches upwards, which inosculate with others from the Humeral, Scapulary, and Circumflex Arteries. The principal Branches run to the Coraco-brachialis and Triceps, and to the Muscles at the outer part of the Elbow;—and one of them, termed *Large communicating Ulnar*, or *Profundo-ulnar*, descending at the inner side of the Arm, is sometimes so considerable as to form the—

### PROFUNDA INFERIOR.

The PROFUNDA INFERIOR, vel MINOR, is frequently a Branch of the Profunda Superior, but more commonly an original Branch sent off from the Trunk of the Artery, near the middle of the Arm.

It gives Branches to the Muscles and other parts at the inside of the Arm, and terminates about the inner part of the Os Humeri.

### RAMUS ANASTOMOSTICUS MAGNUS.

The RAMUS ANASTOMOTICUS MAGNUS, comes off a little above the Elbow, and bestows Branches to the Brachialis Internus, to the under end of the Triceps, and to the Muscles, Ligaments, and parts in general about the Elbow-Joint. The Ramus Anastomoticus is variable both in its origin and distribution; frequently instead of one there are two, or even three Anastomosing Arteries at this part of the Arm.

The smaller Branches sent from the Humeral Artery, pass in succession from the Trunk to the Muscles and other parts adjacent. They are shorter than the rest, and run more in a transverse direction, especially those to the Biceps. One small Branch, termed *Nutritia*, or *Medullaris*, goes into the Substance of the Bone by the passage near its middle, and supplies the Marrow, and parts which contain it; though this Branch is sometimes sent off from some of the Branches in the neighbourhood.

The Trunk of the Humeral Artery, having sent off the different Branches which belong to the Arm, passes to the middle of the bending of the Elbow, between the Aponeurosis and Round Tendon of the Biceps.

About an inch below the Elbow, it commonly divides into two principal Arteries, the *Radial* and *Ulnar*. It happens, however, now and then, that this division takes place directly over the Joint of the Elbow; at other times about the middle of the Arm; and not unfrequently as high as the Axilla. In some very rare instances, the Humeral Artery divides upon the Arm into two portions, which again unite into a Trunk, that afterwards divides in the common way.

In Lusus Naturæ of this kind, the Branch sent off in the Humerus, whether it be the Radial, Ulnar, or Interosseous, is commonly situated in the vicinity of the Trunk; or if there be an equal division, the two Arteries, or Trunks, have nearly the same situation which the Trunk has in common cases, and like it, also, are continued under the general Aponeurosis.

### RADIALIS.

The RADIALIS passes over the Pronator Teres, and runs on the fore part of the Radius through the whole length of that Bone. It descends between the Supinator Longus and Flexor Carpi Radialis, resting on the Flexor Longus Pollicis.

At the upper part of the Fore-arm, it is covered by the Supinator Longus: In its descent, it becomes more superficial, and, at the under part of the Fore-arm, lies close upon the Radius, and immediately under the Skin, in consequence of which the *Pulse* is commonly felt in this place. Its principal Branches are,

The *Recurrens Radialis*, which is reflected, between the Supinator Radii Longus and Tendon of the Biceps, to the Muscles and parts of the Joint near it, and anastomoses freely with the Profunda and Anastomotica Magna of the Humeral Artery, at the outer part of the Elbow. In one Preparation in the Collection of DR MONRO Jun. the Humeral Artery, about the middle of the Arm, sends a considerable Branch, which joins the top of the Radial Artery; and, in another Preparation, an Artery goes off from the Axillary one, and runs partly into the end of the Radial Trunk, the remaining portion descending superficially to join the Ulnar Arch of the Palm.

Numerous *Lateral Branches*, in the descent of the Artery, to the Muscles and Integuments, and parts in general situated about the Radius:

The *Superficialis Volæ*, which goes off at the Wrist, and passes over or through the Abductor Pollicis to the Palm. It is sometimes so small as scarcely to reach this part of the Hand. More frequently it is a considerable Artery, sending Branches to the Ball of the Thumb and superficial parts of the Palm near it,—a Branch along the outer side of the Thumb, and an Anastomosing Branch which unites with the Arch of the Ulnar Artery.—Sometimes the Superficial Volar Branch is equal in size to the continuation of the Trunk of the Radial Artery; in such cases it forms a considerable part of the Superficial Palmar Arch of the Ulnar Artery:

*Small Branches* to the Ligaments, Bones, and other parts about the Wrist:

One, or sometimes two Branches, termed *Dorsal*, to the back part of the Metacarpus and Fingers.

At the under part of the Fore-arm, the Radial Artery turns back between the Tendons of the Extensors of the Thumb, and the Bones of the Wrist;—then, getting between the roots of the Metacarpal Bones of the Thumb and Fore-finger, and perforating the Abductor Indicis, it divides into three principal Branches, viz.

The *Arteria Magna Pollicis*, which runs along the side of the Thumb next the Fingers, and sometimes divides at the root of the former into two Branches, which supply both sides of it:

The *Radialis Indicis*, which runs along the side of the Fore-finger next the Thumb:

The *Palmaris Profunda*, which crosses the Hand between the roots of the Metacarpal Bones and Flexors of the Fingers, and forms an *Arcus Profundus*, from which Branches go off to the Interossei and other deep parts of the Palm.

### Ulnaris.

The Ulnaris, somewhat larger than the Radialis, is found at the anterior and inner part of the Fore-arm. It appears at first as the continuation of the Trunk of the Humeral Artery.

At its upper part it sinks deep behind the Flexor Muscles of the Hand, and passes afterwards, for some way, between the Flexor Sublimis and Profundus Digitorum. When its origin is in the Upper Arm, it commonly runs superficially upon the Aponeurosis of the Fore-arm, in which case the Radial appears as the continuation of the Trunk of the Humeral Artery.

Near the Wrist, it becomes more superficial, and runs between the Tendons of the Flexor Carpi Ulnaris and Flexor Digitorum Profundus, to the Hand.

In this course, it sends off many Branches to the Fore-arm, among which the following are the most considerable, viz. the Recurrens Ulnaris, Interossea Posterior, and Interossea Anterior.

The *Recurrens Ulnaris* runs deep among the Flexor Muscles, and soon divides into Branches, which ascend and supply the parts about the posterior and inner side of the Elbow and Capsule of the Joint.—In the Groove behind the Inner Condyle of the Os Humeri, it communicates by distinct Anastomoses with the

Profunda Inferior, or with the Ramus Anastomoticus, sent down from the Humeral Artery.

### INTEROSSEA POSTERIOR.

The INTEROSSEA POSTERIOR comes off at the upper end of the Interosseous Ligament, perforating that Substance immediately after coming off from the Ulnaris, and going to the back part of the Fore-arm.

From this place it sends upwards a *Recurrent Branch*, which communicates, upon the back part of the Elbow, with the other Recurrent Arteries, and with the Branches sent down from the Humeral Artery, and forms along with these a Plexus of Vessels upon the posterior part of the Joint.

The Interossea is afterwards continued downwards, and is chiefly dispersed upon the Bellies of the Extensor Muscles of the Hand and Fingers, being commonly exhausted before it reaches the Wrist.

### INTEROSSEA ANTERIOR.

The INTEROSSEA ANTERIOR generally comes off immediately below the former, but at other times in common with it. Now and then, both are from the Radial Artery; and this is for ordinary the case where that Artery takes its origin in the Upper Arm. Sometimes the Interosseæ arise by a common Trunk from the Humeral Artery.

The Anterior Interosseous Artery is considerably larger than the Posterior, but is only about half the size of the Ulnar Artery, from which it springs.

It runs close upon the fore part of the Interosseous

Ligament, and furnishes Branches to the Muscles and deep parts upon the anterior side of the Fore-arm, and the *Nutritious Arteries* of the Radius and Ulna.

Near the Wrist, the principal part of the Artery perforates the Ligament, and goes to the posterior side of the Carpus and back of the Hand, dividing there into Branches which inosculate with others of the Posterior Interosseous and Radial Arteries. The other part of the Artery is spent about the Ligaments on the fore-side of the Wrist. Sometimes the Interossea is continued under the Anterior Ligament of the Wrist, and terminates in one of the Palmar Arches.

The Ulnar Artery, having given off its Recurrent Branch, and the Arteriæ Interosseæ, with many Lateral Branches to the inner side of the Fore-arm, passes by the Radial side of the Os Pisiforme, and then over the Annular Ligament, very seldom under it, into the Palm, where it forms the *Arcus Volaris Superficialis.*

At the under end of the Fore-arm, it sends off a *Dorsal Branch*, which passes behind the Tendon of the Flexor Carpi Ulnaris to the back of the Hand, where, joining with Branches of the Anterior Interosseous and Radial Arteries, it assists in forming a Plexus which supplies the back part of the Wrist, Hand, and Fingers, with a number of Branches, which are small when compared with those in the Palm.

The *Arcus Volaris Superficialis*, vel *Sublimis*, is placed with its convex side towards the Fingers, and extends obliquely from the root of the Metacarpal Bone of the Little Finger towards that of the first Bone of the Thumb; being covered by the *Aponeurosis Palma-*

*ris.* Sometimes there are two Superficial Arches, one from the Ulnar, the other from the Radial Artery.

From the Arcus Volaris, Branches are sent off in the following order, viz.

Several *Small Branches* to the Integuments and other Superficial parts of the Palm.

A considerable Branch, termed *Ulnaris Profunda* of the Palm, which sinks near the root of the Metacarpal Bone of the Little Finger, and, inosculating with the Palmar Branch of the Radial Artery, assists in forming the Arcus Profundus:

A *Branch* to the inner side of the Little Finger:

*Three Large Digital Branches*, which run opposite to the Interstices of the Metacarpal Bones, to the roots of, or clefts between, the Fingers.

At these clefts, each of the three Digital Arteries is subdivided into two Branches, one of which Branches of each Division runs along the Anterior Radial Margin of one Finger, and the other along the Anterior Ulnar Margin of the Finger next it;—the three Digital Arteries thus supplying the Margins of all the Fingers, excepting the inner Margin of the Little Finger, and the outer Margin of the Index.

At the roots of the Fingers, each of the Digital Arteries receives a small Branch from the Arcus Profundus.

At the Joints, but more particularly near the points of the Fingers, the Arteries communicate by cross Arches, and send Branches to the parts adjacent, an intricate Plexus being at length formed at the extremities of the Fingers.

The Superficial Arch of the Palm commonly sends off one of the Arteries of the Thumb, and ultimately communicates by a large Anastomosis with the root of the Arteria Magna Pollicis.

## VEINS OF THE SUPERIOR EXTREMITY, AND OF PART OF THE NECK.

The Veins of the Superior Extremities have numerous *Valves*, and are divided into a *Superficial* and a *Deep Set;* the former lying immediately under the Integuments, the latter accompanying the Arteries, and taking their names from them.

The Subcutaneous Veins have many large Anastomoses with each other, particularly on the Fore-arm, where they unite, separate, and re-unite several times, thus forming a Plexus by which it is surrounded. They form also considerable Anastomoses with the deep-seated Veins.

The Superficial Veins from the back of the Hand, (one of which, belonging to the Little Finger, was termed by the Ancients *Salvatella*), go chiefly to the *Superficial Radial* and *Ulnar Veins*, and to the Vein termed *Mediana Longa.*

The Superficial Radial Veins run principally to a Vein termed *Cephalica*, and the Superficial Ulnar Veins to one named *Basilica*, at the Joint of the Elbow.

The Superficial Veins on the anterior part of the Fore-arm form a Plexus which communicates laterally with the Radial and Ulnar Veins, and particularly with the Trunk of the *Mediana Longa.*

From this Plexus an *Internal Median Trunk*, or a *Mediana Longa Minor*, is commonly formed, which terminates in the Basilica.

### MEDIANA LONGA.

The MEDIANA LONGA, vel MEDIANA LONGA MAJOR, arises by numerous Branches from the back of the Hand and root of the Thumb, and communicates with the Vena Salvatella.

It crosses over the Radius in a slanting direction, and, a little below the bending of the Elbow, is divided into two short Veins, the *Mediana Cephalica*, and *Mediana Basilica*, which, running obliquely upwards, terminate a little above the Elbow, the former in the Cephalic, and the latter, crossing over the Humeral Artery, in the Basilic Vein.

Though this description corresponds with the general distribution of the Veins of the Fore-arm, yet so great is the variety among them, that they are scarcely found to agree exactly in any two Subjects.

Frequently the Cephalic is almost entirely formed by the Mediana Cephalica, or the Basilic by the Mediana Basilica. Sometimes the Mediana Longa Minor goes into the Median Basilic. There are often more than two short Median Veins;—and sometimes, instead of a Mediana Major and Minor, there is an irregular Plexus; but constantly a communication is found of the Veins on the Radial and Ulnar sides of the anterior part of the Fore-arm, and also a communication between the superficial and deep Trunks at the bending of the Elbow.

### VENA BASILICA.

The BASILICA, in its ascent, forms the principal Humeral Vein, which passes along the side of the Os Humeri, a little to the inner side of the Humeral Artery; and receiving Branches from the corresponding side of the Arm, and communicating with the deep Veins, it runs into the Arm-pit, and forms the Vena Axillaris.

### VENA CEPHALICA.

The CEPHALICA ascends at the outer side of the Biceps, receives Branches from the adjacent parts of the Arm, communicates in several places with the Basilica, and, passing in the Groove between the Pectoralis Major and the Deltoides, terminates in the Axillary Vein.

The *Deep Veins*, termed also *Venæ Satellites*, vel *Concomites*, run close by the sides of their respective Arteries, one lying commonly on each side of the Artery, and receiving the Blood from the adjacent parts.

In various places they Anastomose with each other by short Branches, which cross over the Arteries.

Near the Joint of the Elbow, the *Deep Radial, Ulnar,* and *Interosseous Veins,* form a Plexus over the Bifurcation of the Humeral Artery.

From this Plexus, a short but large Branch passes outwards, and forms a communication with one of the Subcutaneous Veins; and, in general, the communication is with one of the Median Veins.

### Vena Axillaris.

The Vena Axillaris, formed by the Trunks of the Superficial and Deep Humeral Veins, receives the *Veins* corresponding with the *Circumflex Arteries*, and the *Internal*, and the *Inferior Dorsal Veins* of the *Scapula*.

A little higher, it is joined by the *Venæ Thoracicæ Externæ*, and about this place changes its name for that of *Subclavian Vein*.

### Vena Subclavia.

The Vena Subclavia passes between the Subclavian Muscle and first Rib, at the inner side of the Trunk of the Artery, and afterwards goes over the fore part of the Scalenus Anterior; of course, is more superficial than the Artery at the under end of the Neck.

After crossing the first Rib, it receives the *Vein* corresponding with the Superior Dorsal Artery of the Scapula, the *Veins* which belong to the Cervical Arteries, and also *small Veins* from the Skin and Muscles on the back part of the Neck.

While situated in the Neck, it likewise receives the *External*, and then the *Internal Jugular Veins*; and near this last, a *Vein* of considerable size, which corresponds with the Trunk of the Vertebral Artery.

The *Vertebral Vein* communicates within the Cranium, by small Branches, with the Inferior Petrosal Sinuses, or with the Occipital Sinuses; but is chiefly formed by Branches arising from the Spinal Marrow and its Membranes, and from the Bones and deep-seated Muscles of the Neck.

Behind the top of the Sternum, the Subclavian Vein frequently receives the *Inferior Laryngeal Vein*, the *Anterior External Jugular*, and the *Internal Mammary Vein*, which at other times go into the Superior Cava. —Besides these, the *Left* Subclavian receives also the *Left Superior Intercostal Vein*; after which it goes across the root of the Great Arteries sent up from the Arch of the Aorta, and, opposite to the Cartilage of the Right First Rib, joins its fellow of the other side, to form the Cava Superior.

## BLOOD-VESSELS WITHIN THE THORAX.

Of the Blood-vessels within the Thorax, the *Pulmonary Arteries* and *Veins*, the *Aorta*, the *Coronary Vessels*, and the other Vessels connected with the Heart, have been already taken notice of.

The following are those which remain to be described, viz. the Mammaria Interna, Bronchiales, Esophageæ, Intercostales, and Pericardiacæ.

## ARTERIES.

### Mammaria Interna.

The Mammaria Interna, vel Arteria Sternalis, arises from the Subclavian, opposite to the Inferior Laryngeal, and descends between the Pleura and Cartilages of the True Ribs, and between the Intercostales Interni and Sterno-costalis, at the edge of the Sternum. It sends off,

A *small Reflected Branch* to the Integuments and Muscles adjacent to the Clavicle:

One or two small Branches, termed *Thymicæ*, to the Thymus Gland, and which, like the Gland itself, are most considerable in the young Subject:

A minute Branch, termed *Comes Nervi Phrenici*, and *Pericardio-Diaphragmatica*, which accompanies the Phrenic Nerve, and, after giving Twigs to the neighbouring Membranes, is distributed upon the Diaphragm:

Some small Branches, called *Mediastinæ*, and *Pericardiacæ*, to the Mediastinum and Pericardium, and others to the Sternum and Cartilages of the Ribs.

*Several Branches*, outwards, to the Intercostales, and others between the Cartilages of the True Ribs, at the edge of the Sternum, to the Pectorales, Mamma, and Integuments, which communicate with those of the Thoracicæ Externæ:

A *Large Branch* at the under end of the Thorax, or near the Cartilage of the Sixth Rib, termed *Musculo-phrenica*, which is dispersed upon the Diaphragm, and partly also upon the Transversalis Abdominis, and communicates with the Intercostals.

The Mammary Artery afterwards emerges from the Thorax, commonly under the Cartilage of the Seventh True Rib, and forms an *Epigastric Branch*, which runs near to the Umbilicus, anterior to the Peritoneum, upon the back part of the Rectus Abdominis, upon the upper end of which it is dispersed, after sending a Branch to the Obliqui Abdominis.

### ARTERIÆ BRONCHIALES.

The ARTERIÆ BRONCHIALES come chiefly from the fore and near the upper part of the descending Aorta, and are distributed to the Lungs. They vary much in different Subjects, both in origin and number. They commonly consist of,

The BRONCHIALIS DEXTRA, which arises sometimes from the Aorta, more frequently, however, from the uppermost Aortic Intercostal, and runs to the corresponding Lung:

The BRONCHIALIS COMMUNIS, which is only sometimes present. It arises from the upper and fore part of the descending Aorta, divides into two Branches, one to the left Lung, the other to the right Lung, and also to the Esophagus:

The BRONCHIALES SINISTRÆ, Superior et Inferior, which are of unequal size, arising from the fore part of the Aorta, at a little distance from each other; the Inferior occasionally coming off from those of the Esophageals.

The Bronchial Arteries send small Branches to the Esophagus, to the Posterior Mediastinum, to the Pericardium, and to the Bronchial Glands, and afterwards accompany the Branches of the Trachea through the Substance of the Lungs, being dispersed upon the Bronchi, upon the Coats of the Pulmonary Artery and Veins, and upon the Cellular Substance and Membranes of the Lungs; where they communicate also by minute Branches with the Pulmonary Artery.

### ARTERIÆ ESOPHAGEÆ.

The ARTERIÆ ESOPHAGEÆ are a few minute Branches arising from the different parts of the Aorta, or from the Bronchials, and dispersed upon the Esophagus, also sending Twigs to the Posterior Mediastinum and Pericardium.

### INTERCOSTALES.

These consist of the following Branches, viz. the Intercostalis Superior, and Intercostales Inferiores.

### INTERCOSTALIS SUPERIOR.

The INTERCOSTALIS SUPERIOR, vel SUBCLAVIA, comes off from the Subclavian Artery, a little farther out than the Mammary one, or sometimes from one of the Branches of the Subclavian. After sending a Branch upwards to the Deep Muscles and Nerves at the under and fore part of the Neck, it descends, between the Pleura and first Rib, near the Spine, and sends off two or three Branches, which supply an equal number of the uppermost Intercostal Spaces; and one or two Branches which go backwards to the Spine and Spinal Marrow, and to the Muscles of the Back and Neck.

The Branches of this Artery communicate, in the Neck, with others of the Subclavian, and in the Thorax with each other, and with the Mammaries.

### INTERCOSTALES INFERIORES.

The INTERCOSTALES INFERIORES, vel AORTICÆ, are nine or ten Pairs, the number varying with that of the Superior Intercostal Branches. They arise from the lateral and back part of the Aorta, and run in the Grooves at the under edges of the Ribs, between the Intercostales Externi et Interni, and, of course, are covered by the Pleura.

Towards the fore part of the Thorax, each sends off a Branch to the upper edge of the Rib below it.

They furnish Branches to the Spine, to the Spinal Marrow and its Membranes, to the Intercostales, Pleura, and other parts adjacent; also numerous Branches to the Muscles on the outside of the Thorax, and communicate with each other, with those of the Internal and External Mammary, and with the Diaphagmatic Arteries.

The first of the Aortic Intercostals inosculates with the Superior, or Subclavian Intercostal;—the last, passing behind the Crus of the Diaphragm, goes over the Quadratus Lumborum, and follows the Margin of the Twelfth Rib, to be distributed upon the Tendon of the Transversalis Abdominis.

When there are thirteen, or only eleven Ribs, the number of Intercostal Arteries corresponds with that of the Ribs.

### VEINS.

The Blood sent to the Thorax by the Arteriæ Mammariæ Internæ, Bronchiales, Esophageæ, and Intercostales, is returned to the Heart by the following Veins, viz,

The MAMMARIÆ INTERNÆ, which accompany their corresponding Arteries, and terminate, the Left in the Left Subclavian, and the Right in the Right Subclavian, or in the top of the Vena Cava.

Some small Veins, as the *Pericardiaco-diaphragmatic*, the *Thymic*, and *Pericardiac*, which, in place of joining the Mammary Trunk, commonly terminate, the Right in the Subclavian, or top of the Cava, and the Left in the corresponding Subclavian Vein:

The VENÆ INTERCOSTALES, which are the same in number with their Arteries, and accompany them along the edges of the Ribs.

### VENA AZYGOS.

Several of the Lower Left Intercostals unite into a Trunk, termed *Vena Azygos*, which crosses over the Spine, about the middle of the Thorax,—behind, but sometimes before the Trunk of the Aorta,—to the right side.

The VENA AZYGOS, vel *Vena sine Pari*, thus originally formed by the Lower Left Intercostals, ascends on the fore part of the Spine over the Intercostal Arteries, at the right side of the Aorta.

At its lower extremity, it generally communicates with one of the Lumbar or Renal Veins, and not unfrequently with the Trunk of the Inferior Cava.

Upon the Spine, it receives the *Right Intercostals* and the *Right Bronchial Vein*; and turning forwards over the root of the Great Pulmonary Vessels of that side, it terminates in the Superior Cava, directly before that Vein perforates the Pericardium.

The UPPER LEFT INTERCOSTAL VEINS, or such as are not received by the Vena Azygos, terminate in a Trunk on the left side, improperly called *Left Vena Azygos.*

The LEFT VENA AZYGOS, or SEMI-AZYGOS, LEFT BRONCHIAL, or LEFT SUPERIOR INTERCOSTAL VEIN, besides the Superior Intercostal Branches, receives the Left Bronchial Veins, and Branches from the Esophagus, and other parts near it, and terminates in the Subclavian Vein.

The VENA CAVA SUPERIOR, formed by the union of the Subclavian Veins, with the addition of the Vena Azygos, passes down at the right side of the ascending Aorta, perforates the Pericardium, and terminates in the upper part of the Right Auricle; receiving, therefore, the Blood from the Head and Neck, from the Superior Extremities, from the Parietes of the Thorax, and from the Bronchial Arteries.

## BLOOD-VESSELS *of the* DIAPHRAGM.

The Diaphragm is supplied with *Arteries* from various sources, viz. those entering its upper part from the Internal Mammary, already described; also small Branches from the Intercostal and Lumbar Arteries. Its principal Branches, however, are the *Phrenic.*

### ARTERIÆ DIAPHRAGMATICÆ, vel PHRENICÆ.

The ARTERIÆ DIAPHRAGMATICÆ, vel DIAPHRAGMATICÆ INFERIORES, are two in number, one on each side, though in a very rare instance three, or even four, have been seen. They commonly arise from the fore part of the Aorta, as soon as it enters the Abdomen.

In general, their origins are distinct from each other, but sometimes they arise from a common Trunk; and now and then, one or both originate from the root of the Cœliaca, or even from the Renal or Lumbar Arteries.

They afterwards go obliquely upwards and outwards over the Crura of the Diaphragm, spread out into many Branches, which are chiefly dispersed upon its fleshy sides, and inosculate with those of the Mammariæ Internæ and Intercostales, which enter at its upper Surface.

They likewise give small Branches to the Glandulæ Renales, to the Cardia, and parts in general which lie near them.

### VENÆ DIAPHRAGMATICÆ.

The VENÆ DIAPHRAGMATICÆ, like their corresponding Arteries, run upon the under part of the Diaphragm, and terminate in the Inferior Cava behind the Liver,—the right being commonly a little lower than the left.

# BLOOD-VESSELS OF THE CHYLOPOIETIC AND ASSISTANT CHYLOPOIETIC VISCERA.

## ARTERIES.

THE Arteries of these Viscera consist of the *Cœliac*, and the *Superior* and *Inferior Mesenterics*; all of which are *Azygous*, or single Arteries arising from the fore part of the Aorta.

### ARTERIA CŒLIACA.

The *Arteria Cœliaca* arises from the Aorta, immediately after it emerges from between the Crura of the Diaphragm into the Abdomen, or nearly opposite the Eleventh Dorsal Vertebra. It is situated at the upper edge of the Pancreas, behind the small Curvature of the Stomach, and directly under the Liver.

The Trunk of the Cœliac Artery is remarkably short, being little more than half an inch in length, before it divides into its Three Principal Branches, called, from their destination, *Superior Gastric*, *Hepatic*, and *Splenic*.

### GASTRICA SUPERIOR.

The GASTRICA SUPERIOR, vel CORONARIA VENTRICULI SUPERIOR, is the smallest of the three. It goes upwards and a little towards the left, to reach the right side of the upper Orifice of the Stomach.

Here it sends Branches to the Cardia, which encircle it, and, ascending some way upon the Esophagus, communicate with the Arteriæ Esophageæ.

The Trunk of the Artery afterwards divides, upon the Small Curvature of the Stomach, into principal Branches, some of which run across the upper and under Surfaces, and others obliquely towards the right side, supplying a large portion of the Stomach, and sending Twigs to the Omentum Minus,—while the Trunk is frequently extended as far as the Pylorus.

### Arteria Hepatica.

The Arteria Hepatica, the largest of the three great Branches, is concealed at its root by the Pancreas, and passes obliquely forwards, upwards, and to the right side, behind the Pylorus,—before and a little to the right side of the *Lobulus* Spigelii,—till it arrives at the *Porta* of the Liver.

Where it approaches the Porta, it divides into the *Gastrica Inferior Dextra*, and the *Proper Hepatic Artery.*

### Gastrica Dextra.

The Gastica Dextra, vel Gastrica Inferior Dextra, vel Gastro-Epiploica Dextra, sends out,—

The *Arteria Pylorica*, which, however, is frequently produced immediately from the Hepatic Artery. It gives Branches to the Pylorus and other parts about the small end of the Stomach, and afterwards runs some way along the small Curvature of the latter, inosculating with the Superior Gastric Artery.

Besides this principal Branch, there are a few smaller ones sent from the Gastrica Dextra to the Pylorus:

The *Duodenalis*, which is dispersed upon the beginning and right portion of the Duodenum, along with other Branches coming from the same source, but of inferior size.

*Rami Pancreatici*, distributed to the right end of the Pancreas.

After furnishing the Branches already mentioned, the Inferior Gastric Artery passes under the Pylorus to the great Curvature of the Stomach, along which it runs, to near its large extremity, being included in the Layers of the Anterior Portion of the Great Omentum.

In this course it sends off—

The *Rami Epiploici*, which are long and slender Branches dispersed upon the Epiploon or Omentum:

The *Rami Gastrici*, which, plunging suddenly into both sides of the Stomach, communicate with the Pyloric and Superior Gastric Arteries.

### HEPATIC ARTERY *continued.*

The Hepatic Artery, having given out the Inferior Gastric, and frequently the Pyloric Artery, soon divides into two principal Branches, a right and left, of unequal size, which run into the Porta;—the one,—under the Hepatic Duct,—to supply the great,—and the other to supply the small Lobe of the Liver.

From the Right Branch, before it plunges into the Liver, is sent off the *Arteria Cystica*, which afterwards divides into two smaller Branches, termed *Gemellæ*, that

are

are distributed upon the Gall-bladder, and Trunks of the Biliary Ducts.

The Branches of the Hepatic Artery are ramified extensively through the Substance of the Liver, they supply also the Coat which covers it, and, through the medium of the Ligaments connecting it to the Abdomen, they anastomose with the Phrenic and Internal Mammary Arteries.

Frequently, besides the Hepatic Artery sent off directly from the Cœliac, there is another, coming sometimes from the Superior Gastric, at other times from the Superior Mesenteric Artery, or from the Aorta, to be sent into the Liver. In such cases, the Trunk which gives origin to this additional Artery is greater than usual, and the Hepatic Artery, which this one accompanies, is proportionally smaller.

### ARTERIA SPLENICA.

The ARTERIA SPLENICA, nearly equal in size to the Trunk of the Hepatica, takes a long and serpentine course across the left side of the Body, the Flexures guarding it and the Spleen from being ruptured by overdistension. It runs first behind, then at the upper part of the Pancreas, in its way to the Spleen.—Its Branches are—

The *Rami Pancreatici*, which are few in number, and small. They run at different distances from the Splenic Artery nearly at right angles, and supply the greater part of the Pancreas:

The *Gastrica Sinistra*, vel *Gastrica Inferior Sinistra*, vel *Gastro-Epiploica Sinistra*, which is considerably inferior in length and size to the Gastrica Dextra. It communicates by its Branches with the Gastrica Superior and Inferior, while its Trunk runs a little way towards the right side, along the great Curvature of the Stomach:

The Gastrica Sinistra sends some *Rami Pancreatici, Gastro-Epiploici,* and *Meso-colici Sinistri,* to the Pancreas, to the left portion of the Omentum, and to the Meso-colon; while its Trunk frequently forms a common Arch with the Gastrica Dextra:

The *Vasa Brevia,* vel *Arteriæ Breves,* which are three or four considerable Branches, that run to the left part of the great Curvature of the Stomach, to be distributed upon the upper and under parts of its large extremity; their Ramifications anastomosing with those of the Superior, and of the Left Inferior Gastric Arteries:

The *Rami Splenici,* which, like the Artery, are also contorted. They are several in number, and of considerable size. They go, at the concave side of the Spleen, to be distributed throughout the whole of its substance, but in such a manner, that the Branches of one part of the Spleen do not communicate freely with those of another.

### MESENTERICA SUPERIOR.

The MESENTERICA SUPERIOR, vel MAJOR, arises from the Aorta, immediately below, but almost never in common with, the Cœliac Artery, which it equals in size; and running under or behind the Pancreas, and then over the Duodenum, it passes between the Layers of the Mesentery, towards the under side of the Abdomen.

In its descent, it forms an Arch, being bent forwards and a little to the left side, its lower extremity turning toward the beginning of the Colon.

From the convex side of the Artery, many large Branches are sent off to the Small Intestines; while others proceed from the right side to the right portion of the Colon.

The *First Arteries* sent off from the Trunk are very inconsiderable, running to the Pancreas and to the left portion of the Duodenum, and communicating there with Branches of the Cœliac Artery, and of the Lumbar or other Arteries situated near them.

The principal Branches from the Left or convex side of the Trunk are dispersed upon the Jejunum and Ilium, supplying, in their course, the Layers of the Mesentery, and the parts it contains.

The first of these Branches are short and small; those which succeed gradually increase in length and size as far as the middle of the Arch, after which they diminish again, somewhat in the same proportion, towards the lower part of the Ilium.

In their course through the Mesentery, the principal Branches communicate, first by reciprocal Arches, then by Areolæ or Meshes, of different figures, which increase in number, but diminish in size, like the Vessels themselves, as they approach the Intestines, the convex side of the Arches always being turned towards the part on which the Arteries are to be dispersed.

From the last of these Areolæ, many Branches are detached, which take a straight course to the concave side of the Intestines, where each divides into two that are afterwards ramified on the opposite sides of the Substance of the Gut, forming numberless Anastomoses with each other, first on the same side, then on the opposite one. They terminate at length upon the inner side of the Canal, by Branches so minute as to require the assistance of Glasses to view them distinctly. In this part of the Canal they are observed to form innumerable Plexus.

The Branches produced from the right or concave side of the Trunk are situated between the Layers of the Meso-colon,—their length being almost equal to the breadth of that Membrane.

Near the Colon, they communicate by large, and then by smaller Arches,—but the Arteries here are of greater magnitude than those which belong to the small Intestines; their Arches are also larger, but they are less frequent, and nearer the Gut; of course, the last Ramifications sent off from these Arches are shorter than those belonging to the Small Intestines.

The principal Branches, from the concave side of the Trunk, are the following:

The *Ilio-Colica*, which arises near the under part of the Trunk, supplies the end of the Ilium and beginning of the Colon, and communicates with the Branches sent from the Extremity of the Trunk of the Artery:

A *Short Trunk*, which divides into—

The *Colica Dextra*, vel *Ramus Colicus Dexter*, for supplying the right side of the Colon,—its Branches communicating with those of the Ilio-colica, and with Arteries of the adjacent parts of the Parietes of the abdomen:

The *Colica Media*, vel *Ramus Colicus Medius*, vel *Arteria Media Anastomotica*, which proceeds to the great Arch of the Colon.

Near the Colon, the Colica Media divides into two large Branches, one forming an Arch with the Colica Dextra, the other with a Branch of the Mesenterica Inferior.

From the opposite side of the Colon, Branches of this Artery run to the Omentum, and communicate with the Gastro-Epiploic Arteries.

Besides the Colic Branches already described, there is frequently an additional one, which arises from the beginning of the Superior Mesenteric Artery, and in its ascent splits into two others; one of which, uniting with the Colica Media, forms the large Meso-colic Arch, and the other a similar Arch with the ascending Branch of the Inferior Mesenteric Artery.

Sometimes the Superior Mesenteric Artery has been found to communicate at the Head of the Pancreas, by a large Branch, with the Arteria Gastrica Dextra.

## MESENTERICA INFERIOR.

The MESENTERICA INFERIOR, vel MINOR, arises from the anterior and left side of the Aorta, somewhat lower than half-way between the Superior Mesenteric and the Bifurcation of the Aorta.

It descends obliquely behind the Peritoneum, upon

the

the left Psoas Muscle, and soon divides into principal Branches.

These, near the Intestines, join with each other, and form Arches, from which others go off, composing Areolæ, and, in the Substance of the Intestines, Anastomoses and Plexus, much after the same manner with those which belong to the Right side of the Colon.—The principal Branches are,—

The *Ramus Ascendens*, which divides near the Intestine into two Branches; one of which joins the Colica Media, to form the great Meso-colic Arch, the other is reflected upon the left portion of the Colon:

The *Colica Sinistra*, vel *Ramus Colicus Sinister*, which is frequently double from its origin, or at other times splitting into two Branches, one joining the Ramus Ascendens, the other passing down by the Sigmoid Flexure of the Colon;

The *Hemorrhoidalis Interna*, which is of great size, being the Trunk continued. It anastomoses with the Colica Sinistra, and afterwards descends by many Branches, upon the back part of the Rectum, as far as the under extremity of that Intestine; communicating with the Arteries in the adjacent parts of the Pelvis.

## VEINS.

The VEINS which return the Blood from the Chylopoietic and Assistant Chylopoietic Viscera, accompany their respective Arteries; the Hepatic Veins excepted. They have, like their Arteries, large and frequent communications with each other, are much superior in size, and, as well as the other Veins of the Viscera situated in the great Cavities, are destitute of Valves.

The following are the principal Trunks, viz. the Mesenterica Inferior, Splenica, and Mesenterica Superior.

### MESENTERICA INFERIOR.

The MESENTERICA, vel MESARAICA MINOR, vel HÆMORRHOIDALIS INTERNA, runs upon the left side of the Spine, and receives—

The *Proper* VENA HÆMORRHOIDALIS INTERNA, which returns the Blood from the Intestinum Rectum:

The *Venæ Colicæ Sinistræ*, which return the Blood from the left portion or side of the Colon:—and

The *Vena Duodenalis*, which returns the Blood from the left portion of the Duodenum.

The Mesenterica Minor commonly terminates in the Vena Splenica, though frequently in the Mesenterica Superior.

### VENA SPLENICA.

The *Vena Splenica*, situated at the under side of its Artery, and immediately behind the Pancreas, receives—

The *Rami Splenici*, which return the Blood from the Spleen:

The *Rami Pancreatici*, which pass from the under side of the Pancreas:

The *Venæ Breves*, vel *Vasa Brevia*, which come from the left or great end of the Stomach:

The *Vena Gastrica Sinistra*, vel *Epiploica Sinistra*, which comes from part of the great Arch of the Stomach, and corresponding portion of the Omentum:—and

The *Gastrica Superior*, which comes from the small curvature of the Stomach, and Omentum Minus, and goes into the Splenic near its termination, or into the beginning of the Vena Portæ.

The Splenic and Inferior Mesenteric Veins, after receiving their respective Branches, form a short Trunk which joins the Superior Mesenteric.

### MESENTERICA SUPERIOR.

The VENA MESENTERICA SUPERIOR, vel MAJOR, is situated at the under side of the Artery, and receives—

The *Rami Mesenterici*, which are very large and numerous, returning the Blood from the Jejunum and Ilium,—the Branches going to the left side of the general Trunk:

The *Ilio-Colica*, which comes from the end of the Ilium and beginning of the Colon:

The *Colica Dextra*, which belongs to the right side of the Colon, and terminates in the right or concave side of the Mesenteric Trunk:

The *Colica Media Anastomica*, which comes from the right portion of the great Arch of the Colon, after forming, with the descending Branch of the Mesenterica Minor, a large Arch similar to that of the corresponding Artery. It terminates also in the right side of the Trunk:

The *Gastro-Epiploica Dextra*, which belongs to the right portions of the Stomach and Omentum, and frequently unites with the Veins from the side of the Colon, forming a short common Trunk, which has the term of *Gastro-Colica* applied to it:—and

The *Pylorica* and *Duodenalis,* which sometimes terminate in the Superior Mesenteric, at other times in the Gastrica Dextra.

The Great Mesenteric Vein, formed by the Branches mentioned above, passes over the beginning of the corresponding Artery, and joins the Vena Splenica.

The Trunk formed by these Veins runs under the head of the Pancreas, and here obtains the name of *Vena Portæ,* vel *Vena Portarum.*

### VENA PORTÆ.

The VENA PORTÆ, formed by the two Mesenterics, and by the Splenic Vein, returns the Blood from the Stomach and Intestines, and from the Spleen, Pancreas, and Omenta.

The under part of the Vena Portæ is termed by some Authors *Vena Portæ Abdominalis,* vel *Ventralis;* while the upper part,—being of great size, but without having any particular dilatation in it, is called *Sinus* of the Vena Portæ.

The Vena Portæ, at its beginning, frequently receives the Vena Gastrica Dextra, the Gastrica Superior, the Pylorica, and the Duodenalis, which at other times terminate in one of the great Trunks which form it.

It passes upwards, inclining a little to the right in its course to the Liver, having the Trunks of the Biliary Ducts before, and the Hepatic Artery on the left side of it,—and is about three or four inches in length.

When it reaches the Porta of the Liver, it receives the Venæ Cysticæ into its Trunk, or into its right division, either by two separate Branches, or these united into a single Vein.

In the Porta, it divides into two great Branches, a right and left, sometimes termed *Venæ Portæ Hepaticæ*, which go off nearly at right angles, to be dispersed through the Substance of the Liver, after the manner of an Artery; the subordinate Branches accompanying those of the Arteria Hepatica.

From the extremities of the Vena Portæ, and likewise from the extremities of the Hepatic Artery, a set of Veins arise, termed *Venæ Hepaticæ*, and sometimes *Venæ Cavæ Hepaticæ*, which accompany the Branches of the Hepatic Artery and Vena Portarum.

The Branches of the Venæ Hepaticæ afterwards unite into large Trunks, which recede from the Hepatic Artery and Vena Portæ, and terminate in the Inferior Cava.

Their termination in the Cava is by two, and frequently by three Trunks, at the place where it perforates the Diaphragm; but commonly below this, a few small Hepatic Branches go into the Cava, where it is situated behind the Liver.

# BLOOD-VESSELS OF THE ORGANS OF URINE AND GENERATION.

## ARTERIA RENALIS.

The ARTERIA RENALIS, called also *Arteria Emulgens*, arises opposite to its fellow, from the side of the Aorta, a little below the root of the Superior Mesenteric Artery.

It runs across the Spine and Psoas Muscle, nearly in a transverse direction, descending, however, a little in its course towards the Kidney. The Artery of the right side goes behind the Vena Cava, and is longer than the left, in consequence of the Cava being situated between the Aorta and the Right Kidney.

At the concave edge of the Kidney, the Artery divides into three or four Branches, varying in length in different Subjects, which sometimes send Twigs to the Glandula Renalis and Tunica Adiposa of the Kidney.

The Renal Branches then plunge into the Substance of the Kidney, surround its Pelvis, and afterwards ramify chiefly in its Cortical Substance; forming Arches with each other, but few in number, at the roots of the Papillæ.

Frequently, instead of one Renal Artery, there are two from the Aorta to each Kidney, or sometimes the Artery is single in one side of the Body, and double in the other; and, in rarer instances, three or more have been found. There is occasionally, also, some variety in point of origin, sometimes the right coming off higher than the left, and sometimes the reverse.

In a specimen in the Anatomical Museum of the University of Edinburgh, one of the Kidneys, which is situated in the back part of the Pelvis, has its Artery from the Bifurcation of the Aorta, while the other, placed a little higher than, and towards the left side of the former, derives its Artery from the lateral part of the Aorta, a little below the Mesenterica Inferior.

### VENA RENALIS.

The VENA RENALIS, vel EMULGENS, terminates in the inferior Cava, and is more superficial, and less variable, than its corresponding Artery. It is the largest Vein received by the Cava from its origin to the part where it reaches the Liver.

The Left Renal Vein is longer than the Right, in consequence of the Aorta lying between the left Kidney and the Cava. It is situated on the fore part of the Aorta, and goes first behind, but afterwards anterior to the corresponding Artery. Sometimes, though rarely, it passes between the Aorta and Spine.

The Right Vein is short, it covers the Artery, and passes directly into the Cava.

### ARTERIÆ ET VENÆ CAPSULARES.

The ARTERIÆ CAPSULARES, or *Arteries of the Renal Capsules or Glands*, are small but numerous.

They are derived from the Renal and Diaphragmatic Arteries, and sometimes get Twigs from the Cœliac, or from the Lumbars; and, in general, the Renal Gland, especially the Left, receives additional Branches from the Trunk of the Aorta. The Capsular Arteries inosculate with those of the adjacent Viscera.

The VENÆ CAPSULARES commonly unite into a large Trunk, which, in the left side, terminates in the Vein of the Kidney, while in the right it frequently goes into the Cava.

### ARTERIÆ ET VENÆ ADIPOSÆ.

The Arteries which supply the Tunica Adiposa of the Kidney are numerous Twigs proceeding from the Diaphragmatic, Capsular, and Renal Arteries, or from others near it.

The *Veins* which return from the extremities of these Arteries, pass into the Trunks adjacent.

### ARTERIA ET VENA SPERMATICA.

The ARTERIA SPERMATICA, the diameter of which is small when compared with its great length, arises opposite to its fellow, from the fore part of the Aorta, a little below the Renal Arteries.

Sometimes it arises from the Arteria Renalis, or Capsularis, at other times a little higher from the Aorta; in rarer instances, from the Diaphragmatic Artery, or from one of the Lumbares, and frequently the one comes off a little higher than the other, and occasionally they come off from the Aorta in a common Trunk.

It descends, in a waving direction, on the Surface of the Psoas, behind the Peritoneum; the right passing obliquely over the Cava, the left behind the Colic Arteries of the same side, and both crossing before the Ureters, to reach the under part of the Abdomen.

After this it goes over the Epigastrica, perforates the Abdominal Rings, and runs in the Spermatic Cord, where it divides into Branches, which are dispersed, some upon the Epididymis, while others, larger and much convoluted, run forwards across the Surface of the Testicle, plunge into its Substance, and are distributed upon the Seminal Ducts.

In the descent of the Artery, it imparts *Twigs*—

To the Tunica Adiposa of the Kidney;

To the Peritoneum and Cellular Substance near it; —and,

To the Ureters,—which are also supplied with other Arteries from the adjacent Vessels, viz. from the Renal and Capsular Arteries, from the Aorta, Iliacæ, and Vesicales;

To the Cremaster and Scrotum, anastomosing there with the Pudic, and with its fellow on the other side.

In its descent, it communicates with Branches of the Lumbar, Mesenteric, and other adjacent Arteries.

In its course through the Abdomen, it has been observed to be somewhat increased in size and of a serpentine direction; which circumstance is very remarkable in some of the large Quadrupeds, as the Bull.

The VENA SPERMATICA is much larger than its corresponding Artery, and is furnished with Valves within, but more particularly without the Abdomen.

It composes a Plexus which accompanies the Artery; and about the place where it recedes from it, which is nearly opposite to the under end of the Kidney, it forms a single Trunk, which in the right side goes into the

Cava a little below the Emulgent Vein, and in the left into the corresponding Vena Renalis.

Besides the Artery commonly called *Spermatic*, the Testicle generally receives a smaller *Branch* from the Hypogastric, and frequently also a minute *Branch* from the Epigastric, which accompany the Vas Deferens to the Body of the Testicle, upon which they are dispersed, communicating there with the Branches of the Spermatic Artery.

The *Veins* proper to these Arteries terminate in the Hypogastric and Epigastric Veins.

The *Spermatic Artery*, in the Female, has the same kind of origin, and the same course through the Abdomen, as in the Male, but is frequently more tortuous; especially during Pregnancy, when it also increases in size in proportion to the size of the Uterus. In place of perforating the Abdominal Rings, as it does in the Male, it descends into the Pelvis, between the Lamina of the Ligamentum Latum, to be dispersed first upon the Ovarium and Uterine Tube, and then upon the Fundus of the Uterus itself,—passing in at its corner, and communicating with the Artery of the opposite side.

The Spermatic Veins have the same termination in the Female as in the Male,—but are considerably larger.

## ARTERIÆ ILIACÆ.

The Iliac Arteries consist of the *two common Iliacs*, which are formed by the division of the Aorta; and of the *External* and *Internal Iliacs* of each side, which are formed by the Bifurcation of the Iliacæ Communes.

The *External Iliac* passes out of the Abdomen behind the *Ligament of* POUPART; the *Internal*, termed also *Arteria Hypogastrica*, descends obliquely into the Pelvis.

At the side of the Pelvis, the Internal divides into many Branches, some of which belong to the Organs of Urine and Generation, the rest to other parts of the Pelvis and adjacent parts of the Thigh.

The following are the Branches sent from the Hypogastric Artery to the Organs of Urine and Generation.

### ARTERIA UMBILICALIS.

The ARTERIA UMBILICALIS appears in the Fœtus, as the continued Trunk of the Internal Iliac; but in the Adult, is shrivelled into a Ligament, excepting at its beginning or under part.

The beginning of the Umbilical Artery gives off—

One or more, but most frequently two, *Arteriæ Vesicales*, which run to the under part of the Bladder, and extend along its sides as far as the Fundus Vesicæ. At their Origin, they furnish Twigs to the Vesiculæ Seminales, Prostate Gland, and Intestinum Rectum.

In the Female, the Umbilical Artery sends minute Branches to the Bladder, Uterus, Vagina, and Rectum.

### ARTERIA UTERINA.

The ARTERIA UTERINA, termed also *Uterina Hypogastrica*, is much larger than the Spermatic Artery; and, like that Artery, increases in size in the state of Pregnancy.

It arises from the Hypogastric, near the origin of the

Pudic, Hæmorrhoidal, or Umbilical Arteries, and runs into the Uterus at its under extremity.

It is afterwards reflected upwards along the edge of the Uterus, towards its Fundus or upper part, where it meets with the Spermatic Artery, with which it forms frequent Anastomoses. It runs under the outer Coat of the Uterus, and sends off many serpentine Branches, which plunge into its Substance; forming numerous communications with the Artery of the opposite side.

The Uterine Artery sends Branches downwards, to be distributed extensively upon the Substance of the Vagina, a principal Branch of which is termed *Vaginalis*, and others forwards, to be dispersed upon the Bladder.

### ARTERIA VAGINALIS.

The ARTERIA VAGINALIS is commonly from the Uterine, at other times it is from the Trunk of the Hypogastric, or from some of the adjacent Branches, particularly the middle Hæmorrhoidal. It is extensively distributed upon the Vagina, communicating with the Uterine Branches at the Cervix of the Uterus.

Besides this, there are other smaller Vaginal Branches from the neighbouring Arteries, as the *Vesicales*, *Uterina*, and *Pudica*, which communicate with each other, and with the proper Vaginalis, upon the Substance of the Vagina.

### ARTERIA PUDICA.

The ARTERIA PUDICA, vel PUDENDA COMMUNIS, named from its belonging to the Parts of Generation in both Sexes, comes off either immediately from the Trunk of the Hypogastric, or from the Arteria Ischiatica.

It passes out of the Pelvis, through the under part of the Notch of the Os Ilium, at the lower edge of the Pyriformis.

It then turns between the Sacro-sciatic Ligaments, to get to the inner side of the Tuber Ischii, where it is lodged so deep in the Cellular Substance, as to be in some measure again in the Cavity of the Pelvis.

From the Tuber, it proceeds along the inner side of the Crura of the Os Ischium and of the Os Pubis, and behind the Transversus Perinei and Crus Penis, till it approaches the Symphysis Pubis.

In its course, it sends off many Branches, of which the following are the principal, viz.

*Branches* to the Vesiculæ Seminales, Prostate Gland, Neck of the Bladder, and Rectum:

*Branches* to the Muscles and parts adjacent to the Sacro-sciatic Ligaments; some of them extending as far as the Joint of the Thigh-bone:

*Branches* to the Muscles, Membranes, and Fat about the Tuber of the Os Ischium:

The *Arteria Hæmorrhoidalis Externa*, which soon divides into Branches, to supply the Muscles and Integuments about the verge of the Anus:

The *Arteria Perinei*, which passes under the Transversalis Perinei, in the space between the Crus Penis and Bulb of the Urethra, and gives Branches to the Skin, Muscles, and Fat at the fore part of the Anus, and root of the Penis, and to the Scrotum; while the Artery itself terminates on the under part of the Penis.

One of these Branches, termed *Transversa Perinei*, is necessarily divided, along with the Muscle of that name, in the lateral operation of Lithotomy.

After dispersing the Branches already mentioned, the Pudic Artery divides, at the root of the Penis, into three principal Branches, viz.

The First Branch, which is the smallest of the three. It passes into the Bulb of the Urethra, and is continued forward in the Corpus Spongiosum Urethræ, into the Cells of which many of its Branches open:

The Second Branch, termed *Profunda Penis*, vel *Arteria Cavernosa*, which goes into the Crus Penis of the corresponding side, and directs its course in the axis of the Corpus Cavernosum, through which it passes, in nearly a straight line, to the other extremity of that Body; its Branches communicating, through the medium of the Septum, with the Artery of the opposite side, and by innumerable Branches with the Cells of the Penis:

The Third Branch, called *Dorsalis Penis*, which turns between the Symphysis Pubis and root of the Penis, and proceeds along the Dorsum as far as the Glans, adhering closely to the Ligamentous Substance which incloses the Corpora Cavernosa, and sending Branches to it and to the Integuments.

In some very rare cases, the Pudic Artery, instead of passing between the Sacro-ischiatic Ligaments, has been seen running first by the under part and side of the Bladder, and then over the lateral portion of the Prostate Gland, to its place of destination.

In the Female, the Pudic Artery has the same general course as in the Male.

After reaching the inner side of the Tuber of the Os Ischium, it is extended forwards, and sends Branches to the Anus, Perineum, end of the Vagina, and Labia Externa, and terminates in the Clitoris somewhat in a similar manner as in the Penis. The Branch, which, in the Male, goes to the Bulb of the Urethra, in the Female, passes to the outer end of the Vagina.

## VEINS.

The Blood is returned from the Branches of the Hypogastric Artery dispersed upon the Organs of Urine and Generation, by the following Veins, viz.

The VENA VESICALIS, which returns the Blood from the Bladder:

The VENA UTERINA HYPOGASTRICA, which comes from the Uterus:

The VENA MAGNA IPSIUS PENIS, which runs along the middle of the Dorsum, and is often double to near the root of the Penis; after which it passes between this and the Arch of the Pubis, forming a complicated Plexus which surrounds the Neck of the Bladder and Prostate Gland, and sending out Branches which terminate in others at the sides of the Bladder. Like other Veins subject to pressure, the Vena Penis is provided with Valves:

The VENA PUDICA, which communicates anteriorly with the Branches of the Vena Magna at the root of the Penis, and afterwards passes back with the corresponding Artery:

The VENA TEGMENTORUM PENIS, which is formed by small Subcutaneous Branches, and ends in the top of the Femoral Vein.

The Veins above mentioned, the last excepted, terminate in the HYPOGASTRICA, along with other Veins belonging to the Pelvis, to be afterwards described.

# BLOOD-VESSELS OF THE CONTAINING PARTS OF THE ABDOMEN, AND OF THE PELVIS AND INFERIOR EXTREMITY.

## ARTERIES.

### ARTERIÆ LUMBARES.

THE ARTERIÆ LUMBARES, which come off from the Aorta, are commonly four in number on each side, though sometimes five. They arise in pairs, though sometimes two on either side take their origin by a common Trunk, from the back part of the Aorta, in the same manner as the Intercostals do from that Vessel in the Thorax. The Left are a little shorter than the Right, which pass under the Vena Cava to their place of destination.

They run first over the fore part of the Bodies of the four uppermost Lumbar Vertebræ, and afterwards go between them and the Psoæ Muscles, in their way towards the Parietes of the Abdomen.

They give Branches to the Spine, to the Spinal Marrow and its Membranes; are particularly dispersed upon the Lumbar Muscles, and upon the Transversus and Obliqui Abdominis; and, perforating these, they also furnish Branches to the large Muscles and the Integuments in the back part of the Loins.

They communicate with the lower Intercostal, Diaphragmatic, Internal Mammary, and Epigastric Arteries, and also with their fellows of the same side.

The first Lumbar passes behind the corresponding Crus of the Diaphragm, to which it gives Branches in its course outwards. The fourth winds round the Crest of the Ilium, to be dispersed upon the Iliacus Internus and Abdominal Muscles.

When there is a fifth Lumbar Artery, it comes off from the Aorta, or from the fourth Lumbar, or from the Ilio-lumbar, or from the Sacra Media.

## SACRA MEDIA.

The SACRA MEDIA is an Azygous Artery, of an inferior size to one of the Lumbars. It arises from the under and back part of the Aorta, immediately at its Bifurcation; or, in some rare instances, by a Trunk common to it and the fourth pair of Lumbar Arteries.

It generally sends off a Branch over each side of the last Vertebra of the Loins, which supplies the place of a Fifth Lumbar Artery. This Branch gives off others behind, in common with the Lumbars, while its outer Ramifications are exhausted upon the Iliacus Internus.

The Sacral Artery afterwards descends along the middle of the last Lumbar Vertebra and Os Sacrum, as far as the Os Coccygis, sending Branches to the Membranes and Substance of these Bones, and to the back part of the Rectum.

## ILIACÆ COMMUNES.

After giving off the Arteries of the Contents and of the Containing Parts of the Abdomen, the Aorta, upon the under part of the Fourth Lumbar Vertebra, divides into the two common Iliac Arteries, which are of equal size, and take a similar course upon the right and left sides.

They pass obliquely downwards and outwards; and sometimes, though rarely, send a Twig or two to the Lumbar Glands, or other parts near them. At the under and lateral parts of the last Vertebra of the Loins, *i. e.* opposite to the posterior or Sacro-iliac Symphysis of the Pelvis, each divides into two others, a Posterior, termed *Iliaca Interna*, and an Anterior, called *Iliaca Externa*, as formerly mentioned.

## ILIACA INTERNA.

The ILIACA INTERNA, vel POSTERIOR, vel HYPOGASTRICA, passes downwards and backwards, for about a couple of inches, after which it generally divides upon the Sacro-iliac Symphysis, into a Posterior and an Anterior set of Branches, which come off either separately, or from each other; the former supplying the parts nearest the Sacrum and Ilium, the latter belonging more immediately to the parts about the anterior region of the Pelvis.

### *Posterior Branches.*

### ILIO-LUMBARIS.

The ILIO-LUMBARIS, vel ILIACA INTERNA MINOR, is a small Artery arising sometimes from the end of the Hypogastric, at other times from the beginning of the Glutea.

It passes outwards under the Psoas, and divides suddenly into Branches; one of which frequently forms a kind of *Lumbalis Ima*, or Fifth Lumbar Artery.

The other Branches go to the Psoas and Iliacus Internus, communicating there with the Lumbar Arteries, and with the Branches of the Circumflex Artery of the Ilium;—a particular Twig, constituting an *Arteria Nutritia*, vel *Medullaris*, of the Os Ilium.

### SACRÆ LATERALES.

The SACRÆ LATERALES are generally two, but sometimes three, arising from the common Trunk, or the Ilio-lumbar, or frequently from the Gluteal Artery. Sometimes there is only a single Artery, which descends by the sides of the Sacral Holes, giving Branches, which supply the place of the Sacræ Laterales, and sometimes also, though seldom, of the Sacra Media.

They furnish Branches to the Muscles, Membranes, and Nerves, on the surface of the Os Sacrum, and inosculate by cross Branches with the Sacra Media.

Their principal Trunks enter the Anterior Sacral Holes, to be distributed upon the Cauda Equina, and Membranes and Bones inclosing it.

### ARTERIA GLUTEA.

This is sometimes termed *Iliaca Posterior*, and is the largest Branch of the Hypogastric Artery.

Soon after it arises, it passes between the two Trunks or Heads of the Sciatic Nerve, goes afterwards through the upper part of the great Notch of the Os Ilium, and is reflected over the edge of that Bone, after the manner of the Inferior Dorsal Artery of the Scapula.

Upon emerging from the Cavity of the Pelvis, between the Gluteus Medius and Pyriformis, and after giving Twigs to the Iliacus Internus and Pyriformis, it is divided into a Superficial and a Deep Set of Branches.

The *Superficial Set* creep in between the Gluteus Maximus and Medius, upon the former of which they are chiefly dispersed.

The *Deep Set* run in a radiated direction close upon the Bone, and are chiefly distributed to the two smaller Glutei, while Branches of inferior size run, some of them downwards to the Muscles and Ligaments about the Joint of the Thigh, and others backwards to the parts about the Sacrum.

The Branches of this Artery, which are very extensive, anastomose with each other, with the last of the Lumbars, and with the Sacræ Laterales, through the Posterior Foramina of the Os Sacrum.

### *Anterior Branches.*

### ARTERIA OBTURATORIA, vel OBTURATRIX.

The Obturator Artery has its Origin from the Trunk of the Hypogastric, or from the Ilio-lumbar, or from the Gluteal or Ischiatic, and frequently from the end of the Iliaca Externa, or from the root of the Epigastrica. Sometimes one Branch of the Obturator is from the Internal Iliac, another from the Epigastric, or Trunk of the External Iliac near the Epigastric.

When the Obturator arises from the Hypogastric, or from one of its Branches, it descends in the Pelvis by the inner side of the Psoas Muscle, or over the upper edge of the Obturator Internus, and afterwards passes through the Hole at the upper part of the Obturator Ligament.

While in the Pelvis, it frequently gives Twigs to the Bladder and other parts near it, and, in its passage through the Foramen Thyroideum, sends a Branch to the Obturator Internus.

After perforating the Ligament, it divides into two Sets of Branches, one Set of which are dispersed upon the parts about the Hip-joint, while another belong to the Obturator Externus, and to the Muscles which are situated at the upper and inner part of the Thigh;—the two Sets of Branches inosculating with each other.

When the Obturator comes off from the External Iliac, it commonly goes directly into the Pelvis, but sometimes it makes a Curve by the inner side of GIMBERNAT'S Ligament, and is then found on the fore part of a protruding Bowel in Crural Hernia; but this circumstance happens more frequently where the Obturator arises from the root of the Epigastric. The Trunk common to these two Vessels varies from a quarter to upwards of an inch in length. Where it is long, the Obturator is the napt to take such a turn as to go by the inner side of the Crural Arch, and to be found on the Anterior Surface of a Femoral Hernia.

### ARTERIA UMBILICALIS.

The Umbilical Artery sends off Rami Vesicales from its under part or beginning; the rest of it, in the Adult, being shrivelled into Ligament, as already observed.

VESICALIS IMA of HALLER. This is a long and slender Branch which frequently comes off from the root of the Pudic, at other times from the Hypogastric near the Umbilical, and runs to the under part of the Bladder, and to the Prostate Gland.

### ARTERIA UTERINA.

The Uterine, or Uterine Hypogastric Artery, is dispersed upon the Uterus, as has been already described.

### HÆMORRHOIDALIS MEDIA.

The Middle Hæmorrhoidal, a small Artery, is sometimes sent off from the original Trunk, and at other times from some of its Branches, as the Pudic in the Male, or Umbilical in the Female. Sometimes it is wanting.

It runs upon the Anterior Surface of the Rectum, and is chiefly distributed upon its Under Extremity, where it anastomoses with the Hæmorrhoidalis Interna. It frequently sends Branches to the under part of the Bladder;—to the Vesiculæ Seminales and Prostate of the Male,—and to the Vagina and Bladder in the Female, by a Vaginal Trunk which supplies the place of the Vaginal Artery sent off from the Uterine.

### PUDICA COMMUNIS.

The Pudica Communis, termed by some Authors *Hæmorrhoidalis Externa*, belongs to the Parts of Generation and Anus, as was formerly taken notice of.

### ARTERIA SCIATICA.

The Sciatic, or Ischiatic Artery, is the largest of the Iliac Branches, the Glutea excepted.

It goes through the under part of the Sciatic Notch, between the Pyriform and Gemelli Muscles, accompanied by the Sciatic Nerve, and having the Pyriformis between it and the Gluteal Artery.

It afterwards descends some way down upon the Thigh in company with the Nerve, in the hollow between the great Trochanter of the Thigh-bone and Tuber of the Ischium,—covered by the Gluteus Maximus.

Within the Pelvis, it sends Twigs to the Rectum, Obturator Internus, and Pyriformis. Without the Pelvis, it sends an Artery backwards, termed *Coccygea*, which creeps along the Posterior Sacro-sciatic Ligament; some of its Branches perforating the Fibres of that Ligament. It is distributed upon the Coccygeus, the Levator Ani, the Fat and Bones of the Coccyx, and sends Branches upwards, which anastomose with some of the Lateral Sacral Arteries, through the Holes in the back part of the Os Sacrum.

The Sciatica gives off also a *Concomitant Branch*, which passes along the Surface of the Sciatic Nerve.

It sends Branches to the Gluteus Medius and Minimus, to the Pyriformis and other Rotator Muscles of the Thigh, and to the Capsule of the Joint.

The principal Branches of the Sciatic Artery, however, are dispersed upon the under part of the Gluteus Maximus, some Twigs being sent to the Muscles arising from the Tuberosity of the Os Ischium, which communicate with the Obturator and Pudic Arteries.

### ILIACA EXTERNA.

The Iliaca Externa, vel Anterior, which appears in the Adult as the continuation of the common Trunk, descends in tough Cellular Substance behind the Peritoneum, along the Brim of the Pelvis, taking a curved direction by the inner and fore part of the Psoas Muscle, and afterwards passing over it, and under the *Ligament* of POUPART, to form the Femoral Artery.

In this course, it does not send off any Branches, excepting sometimes a Twig to the Peritoneum, Psoas Muscle, Coats of the corresponding Vein, and the Lymphatic Glands, till it is about to leave the Abdomen, where it gives rise to two principal Arteries,—the *Epigastrica*, and *Circumflexa Ossis Ilii.*

## ARTERIA EPIGASTRICA.

The ARTERIA EPIGASTRICA goes off from the inner side of the External Iliac Artery, immediately before that Vessel gets under the *Ligament of* POUPART, but is found on the outer side of the Peritoneum.

At its origin, it is a little bent downwards; and about half an inch from the place where it first comes off, it crosses obliquely upwards and inwards, at the inner side of the upper Abdominal Ring, behind the Spermatic Cord in the Male, and Round Ligament in the Female.

It commonly passes in such a manner as to lie first behind, then at the inner side of a common Inguinal Hernia; though sometimes we find the reverse of these two circumstances.

It continues its oblique course, under the inferior part of the Transversus, till it reaches about as high as half way between the Symphysis Pubis and Umbilicus, after which it takes a perpendicular direction along the back part, and at the outer side of the middle of the Rectus Muscle.

Near its origin, it sends Branches to the adjacent parts of the Pubes, one of which, in the Male, frequently runs to the Spermatic Cord, and in the Female to the Round Ligament of the Uterus; the Branch to the Cord running to the Cremaster and Scrotum, and anastomosing with the Spermatic and Pudic Arteries, and that to the Round Ligament, going sometimes as far as the Uterus.

Under the Umbilicus, it generally divides into two

Branches, variable in their size; one directed towards the Umbilicus, the other continued in the line of the Rectus.

It furnishes Branches to the Muscles, Integuments, and Membranes of the fore part of the Abdomen, communicates in several places with the Lumbar and Ilio-Lumbar Arteries, and with its fellow of the opposite side, and terminates a little above the Umbilicus, where it forms several distinct, though small Anastomoses, with the under end of the Mammaria Interna.

### CIRCUMFLEXA OSSIS ILII.

The CIRCUMFLEXA OSSIS ILII, sometimes termed *Iliaca Anterior*, almost as large as the Epigastric Artery, arises nearly opposite to it, though frequently a little lower, immediately behind the under end of the Fallopian Ligament. In some rare cases, it comes off in common with the Epigastric, or from the beginning of the Femoral Artery, or from the Profunda Femoris.

It runs at the inner edge of the Crest or Spine of the Os Ilium, between the Transversalis and Obliquus Internus, till it arrives near the Vertebræ of the Loins.

It gives Branches to the Psoas, Iliacus, and Sartorius, to the under end of the Obliqui and Transversus Abdominis, between which it sometimes extends a considerable way. At length it communicates with the Epigastric, and with the Inferior Intercostal and the Lumbar Arteries.

### ARTERIA FEMORALIS.

The FEMORAL, or CRURAL ARTERY, the continuation of the External Iliac,—passes out of the Abdomen between the Ligament of POUPART and Brim of the Pelvis.

At its exit, it is situated superficially over the Ball of the Os Femoris, having the inner edge of the common end of the Psoas and Iliacus Internus between it and the Capsular Ligament of the Joint.

At the top of the Thigh it forms the Inguinal or Common Femoral Artery, so named from its situation, and subsequent division into other Arteries.

Here it is covered by the Lymphatic Vessels and Glands of the Groin, and by the general Aponeurosis and Fat; farther down, it is lodged deep in an angular Cavity at the upper and inner part of the Thigh, with the Rectus and Sartorius upon the outer, and the Triceps Adductor Femoris upon the inner side of it. From this part it descends at the inside of the Thigh, turning gradually backwards till it reaches the Ham, or, rather, strictly speaking, having the Thigh-Bone first upon its outer, then upon its fore part.

From the Inguinal or common Femoral Artery, a few small Branches are sent off to the skin of the Abdomen, to the Superficial Muscles and Inguinal Glands, and to the common Integuments at the upper part of the Thigh; also one or two others, termed *Pudicæ Externæ*, and by some Authors *Pudicæ Externæ Superior et Inferior*, to the Pubes, to the Integuments of the

External Parts of Generation, and to the upper and inner side of the Thigh in both Sexes. Some of these Branches sent from this part of the Femoral Artery, anastomose with those of the Epigastric, and others with the Arteries of the Penis.

About two inches below the Ligament of POUPART, and sometimes, though rarely, about three inches, and in some still more rare cases, directly under this Ligament, the common Femoral Artery divides, somewhat like the common Iliac, into anterior and posterior parts:—The former is the Femoral Artery strictly so called, the latter is termed *Profunda Femoris.*

### PROFUNDA FEMORIS.

The ARTERIA PROFUNDA, also called VASTA POSTERIOR, vel MUSCULARIS FEMORIS, concealed at first by the proper Femoral Trunk, gives off at its origin from that Artery, small Branches arising separately or in a common Trunk, and dispersed upon the Integuments, Muscles, and Capsular Ligament, at the upper and fore part of the Thigh.

It gives next, from its origin also, two large Branches, —the *Circumflexa Interna*, and *Circumflexa Externa*, —which run in opposite directions at the upper part of the Thigh.

### CIRCUMFLEXA INTERNA.

The CIRCUMFLEXA INTERNA, though most frequently coming off from the beginning of the Profunda, often arises higher than it, from the common Femoral; and there are now and then two of them, one a little lower than the other, or sometimes it comes off in common with the Circumflexa Externa.

It passes between the under ends of the Psoas and Pectinalis, and afterwards turns round the inner part of the Neck of the Thigh-Bone.

It sends off—

*Branches* to the Pectinalis, Triceps, and Capsule of the Joint:

A *Superior* or *Anterior Ascending Branch*, to the Triceps and Obturator, which has a considerable Anastomosis with the Obturator Artery at the external Margin of the Foramen Thyroideum, though the communication is not so visible as many have supposed. From this Branch a Twig is detached, which enters the Breach at the under and fore part of the Acetabulum, to be dispersed upon the Ligamentum Rotundum and the Substance called *Gland of the Joint:*

An *Inferior*, or *Inferior Posterior Circumflex Branch*, which is the continuation of the Trunk.

It bends round the Neck of the Thigh-bone, sending small Branches to the Capsule of the Joint, to the Obturator, Quadratus, and Adductores Femoris; communicating with the Obturator, Sciatic, Hæmorrhoidal, Gluteal, and Pudic Arteries.

### CIRCUMFLEXA EXTERNA.

The CIRCUMFLEXA EXTERNA arises for the most part nearly opposite the former, but frequently a little lower.—Now and then it has a double origin, one of the Trunks coming off higher than the other.

It passes outwards between the upper ends of the

Rectus, Tensor Vaginæ Femoris, and Vastus Externus, and over the root of the Trochanter Major of the Os Femoris.

It sends Branches upwards to the under part of the Glutei, and to other Muscles placed at the inferior and back part of the Pelvis, which anastomose with those running down from the Arteria Glutea.

Others which have more of a lateral direction, and are distributed upon the Skin and Muscles at the upper and back part of the Thigh, upon the Muscles more immediately about the Joint, and also upon the Periosteum,—communicating with the Branches of the Circumflexa Interna.

The largest Branches descend between the Rectus Femoris and Vastus Externus; one, longer than the rest, reaching almost as far as the outer part of the Knee.

Sometimes an External Pudic Branch is derived from this Artery, which more frequently comes off from the Trunk of the common Femoral.

### Rami Perforantes.

The Profunda Femoris, having detached the Circumflex arteries, sinks deep behind the Trunk of the Femoralis, and, passing between the Adductor Muscles and Vastus Internus, descends near to the middle of the Thigh.

In its descent, it sends off, or is divided into, principal Branches, termed *Rami Perforantes*, which, after giving out small Branches to the Triceps, perforate it, to be dispersed upon the Flexors and other Muscles on the back part of the Thigh.

The Perforantes come off in the following succession, viz.

The *Perforans Prima*, which arises near the Trochanter Minor, perforates the Triceps a little farther down, and divides into ascending and descending Branches, which supply the Muscles and Integuments in the upper and back part of the Thigh.

The ascending Branches form numerous communications with the Circumflex Arteries, about the root of the Trochanter Major, and anastomose with the Glutea, and, in particular, with the under end of the Sciatica.

The *Perforans Secunda* vel *Magna*, which comes off some way below the former, and is the largest of the perforating Arteries. This also perforates the Triceps.

It gives Branches to the Muscles in general about the middle of the back part of the Thigh, particularly to the Adductors, Vasti, and to the Flexors of the Leg; and communicates above with Branches of the Perforans Prima, and with the two Circumflexæ.

Besides these, there is one, and sometimes two other perforating Branches, which are greatly inferior in size to the two former, and are lost upon the Flexors at the under and back part of the Thigh, and upon the Periosteum; one Twig sent off from these sometimes forming a *Nutritia* vel *Medullaris* of the Os Femoris.

The Femoral Artery, after giving off the Profunda Femoris, passes down, still covered by the Fascia of the Thigh, between the Vastus Internus and insertion of the second or long Head of the Triceps, giving only small Branches to the Muscles and Integuments at the fore and inner side of the Thigh.

One Branch, termed *Ramus Anastomoticus Magnus*, more conspicuous than the rest, is sent off previous to the passage of the Artery through the Tendon of the Triceps. It descends with many Ramifications upon the Vastus Internus, upon which it is chiefly dispersed; inosculating with the descending Branch of the Circumflexa Externa, and below, with Branches about the Knee.

About the middle of the inside of the Thigh, the Trunk of the Artery is situated behind the Sartorius; and, nearly two-thirds down upon the Os Femoris, it perforates the Triceps passing between that Muscle and the Bone, in its way to the Leg.

Having perforated the Triceps, it is found in the back part of the Thigh, where it sends *Rami Perforantes* to the adjacent Muscles and Integuments.

Of the Rami Perforantes two are more constant and considerable than the rest, and called by some Authors *Perforans Superior*, and *Perforans Inferior;* the former distributed to the Muscles at the back and inner, and the latter, after sending off Branches to the Periosteum, and the *Principal Medullaris*, going to those of the back and outer part of the Thigh; and both communicating above with the descending Branches already described.

In this part of the Thigh, the Artery lies close upon the Bone, and adheres firmly to it, till it reaches the Ham, where it is termed *Poplitea*.

### ARTERIA POPLITEA.

The ARTERIA POPLITEA, strictly so called, is that part of the Femoral Artery which lies over the Joint of the Knee; the name, however, is generally applied to all that portion of it which extends from the parts where it perforates the Tendon of the Triceps to the under edge of the Popliteus, or where the Artery is divided into two great Branches.

It is lodged deep in the Hollow between, and protected by, the Ham-strings, Condyles of the Os Femoris, and Heads of the Gastrocnemius Externus.

Where it passes over the Joint, it adheres to the Capsular Ligament. It goes afterwards over the Popliteus, and is covered by its associate Vein and Nerve, and generally by a large quantity of Fat.

It gives off several Branches, which vary in their number, termed *Articulares Superiores et Inferiores*, to the Joint of the Knee.

### ARTERIÆ ARTICULARES.

Four of these, situated two above and two below the Joint, are more regular and constant than the rest, viz.

The *Articularis Superior Interna*, which turns round the Os Femoris, above the Inner Condyle, passes under the Semi-membranosus and Semitendinosus, and, after perforating the Tendon of the Triceps, is dispersed upon the upper and inner part of the Knee, anastomosing with Branches sent down from the Femoral Artery:

The *Articularis Superior Externa*, which arises nearly opposite to the former, passes outwards between the Tendon of the Biceps and Body of the Os Femoris, immediately above its outer Condyle, and is lost upon the Vastus Externus, and upon the upper and outer part of the Knee; its Branches anastomosing with those of its fellow, and particularly with the long descending Branch of the Circumflexa Externa:

The *Articularis Inferior Interna*, which arises opposite the bending of the Joint, passes downwards, and then turns round the Tibia, immediately below its Inner Condyle.

It sends Branches first to the back part, then to the inner side of the Knee; some of them passing by the Semilunar Cartilages into the internal part of the Joint.

It communicates above with the Branches of the Articularis Superior Interna:

The *Articularis Inferior Externa*, which comes off near the former, and passes first downwards, then outwards, between the External Lateral and the Capsular Ligaments, to be dispersed upon the under and outer part of the Knee and inner part of the Joint; communicating with its fellow of the opposite side, and above, with the Branches of the Articularis Superior Externa.

Besides the Superior and Inferior Articulating Arteries, another Branch is frequently found, termed *Articularis Media*, vel *Azygos*, which is irregular in its origin, arising sometimes from the Trunk of the Poplitea, at other times from one of the Superior Articular

Branches. It is situated between the Condyles, and is exhausted upon the Ligaments, Fat, and Bones, at the back part of the Joint; inosculating with all the adjoining Branches.

The other less constant Articular Branches are dispersed upon the Muscles a little above the Joint.

The Articular Arteries form numerous communications with each other; some are expanded in the form of a net-work over the Patella; others are distributed upon the Capsular and other Ligaments of the Joint, while numerous Branches penetrate the Substance of the corresponding Bones.

The Arteria Poplitea, having furnished Branches to the Joint of the Knee, gives others to the Muscles of the upper and back part of the Leg; two of which, termed *Surales*, more considerable than the rest, pass by different Branches into the Heads of the Gastrocnemius Externus.

The Trunk of the Artery descends afterwards between the heads of the Gastrocnemius, and commonly from two to three inches below the bending of the Knee, and at the under and outer edge of the Popliteus, or upper end of the Soleus, divides into two large Arteries, the *Tibialis Antica*, and *Tibialis Postica*.

### TIBIALIS ANTICA.

The TIBIALIS ANTICA, analogous to the Radialis, arises from the fore part of the Poplitea. It passes directly through the upper end of the Interosseous Ligament, at the under edge of the Popliteus Muscle, to the fore part of the Leg.

In its descent in the Leg, it adheres closely to the anterior Surface of the Interosseous Ligament; lying at first between the Tibialis Anticus and Extensor Digitorum, and then between the Tibialis and Extensor Pollicis.

A little above the Ankle, it passes upon the outer and fore part of the Tibia, and, getting under the Annular Ligament and Extensor Pollicis, advances in a waving direction upon the convex surface of the Foot.

It supplies, in general, the Muscles and Integuments which belong to the outer and fore part of the Leg and upper part of the Foot, and is ultimately spent upon the deep Muscles of the Sole.

Its Branches come off in the following order, viz.

A *Small Branch* sent off before the Trunk perforates the Interosseous Ligament, to be dispersed upon the Bones, Ligaments, and Muscles near the Joint, particularly upon the Soleus and Tibialis Posticus; the superior Twigs running in a retrograde direction, and inosculating with the Inferior Articular Branches:

The *Recurrens Anterior*, which arises from the Artery after it has perforated the Ligament, and passes up between the Tibialis Anticus and Extensor Digitorum Longus, to which it gives Branches, and is afterwards distributed upon the Ligaments at the upper part of the Leg, and upon those at the under part of the Knee, anastomosing there with the Inferior Articular Arteries:

*Numerous Branches* sent off, at short distances, in a lateral direction, to the Muscles and Integuments on the outer and fore part of the Leg; many minute Branches spreading out also upon the Periosteum.

The *Malleoli Interna*, which comes off near the lower end of the Tibia, and is dispersed on the parts about the Inner Ankle:

The *Malleoli Externa*, which arises a little lower than the former, and is distributed to the parts near the outer Ankle:

The *Arteria Tarsea*, which takes its origin a little before the bending of the Ankle-joint, and is more considerable in size than the Malleolar Branches.

It passes obliquely outwards and forwards under the Extensor Brevis Digitorum, and sends Branches to the Joint of the Ankle, where it communicates with the Malleolar Arteries.

It supplies the greater part of the Muscles, Integuments, &c. on the upper and outer part of the Foot, and sends Branches, termed *Interosseæ*, to the Muscles between the Metatarsal Bones of the small Toes,—which, however, are frequently derived from the Metatarsal Artery:

*Branches* from the Artery upon the Dorsum Pedis, distributed upon the Integuments, Muscles, Membranes, and Bones, at the upper and inner side of the Foot:

The *Arteria Metatarsea*, which goes off about the middle of the Dorsum Pedis, and passes obliquely towards the root of the Little Toe, assisting the Arteria Tarsea in furnishing Branches to the upper side of the Foot and Toes, and sometimes, in part or entirely, supplying the place of that Artery.

The above is the common origin, course, and distribution of the Arteries upon the upper side of the Foot, but there is great variety in each of these circumstances in different Subjects.

The remaining portion of the Anterior Tibial Artery afterwards advances between the Extensor of the Great and long Extensor of the Small Toes, sending Twigs to the adjacent parts, and dividing, between the Metatarsal Bones of the Great Toe, and that next it, into a *Large Posterior*, and a *Small Anterior Branch.*

The *Posterior Branch*, termed *Anastomotica Profunda*, which may be considered as the continuation of the Trunk, sinks between the Metatarsal Bones of the two first Toes, and anastomoses in the Sole with the Posterior Tibial Artery.

The *Anterior Branch* runs forwards, under the name of *Dorso-metatarsea*, vel *Dorsalis Pollicis*, to be dispersed upon the Great and Second Toes.

TIBIALIS POSTICA.—The Tibialis Postica, somewhat larger than the Antica, divides about a *finger's-breadth* under the origin of the Tibialis Antica, though sometimes considerably lower, into the Fibularis, and Tibialis Postica strictly so called.

### FIBULARIS.

The FIBULARIS, termed also *Peronea*, somewhat corresponding with the Interossea Anterior of the Fore-arm. It is commonly smaller than, though sometimes nearly equal in size to, either of the Tibial Arteries, and runs down at the inner side of the Fibula for a considerable way along the Leg. It is situated, first between the

Tibialis Posticus and Flexor Longus Pollicis, and is afterwards covered by the last-named Muscle.

Its Branches are distributed to the Muscles, Integuments, and other parts at the outer side of the Leg in the neighbourhood of the Fibula,—a small *Medullary Branch* also penetrating the Substance of that Bone. The Branches of the Fibular Artery inosculate forwards with those of the Anterior Tibial, and backwards with the Branches of the Posterior Tibial Artery.

A little above the Inferior Articulation of the Tibia and Fibula, it sends a Branch forwards, termed *Fibularis* vel *Peronea, Anterior*, which perforates the Interosseous Ligament, and is dispersed upon the fore part of the Ankle, where it anastomoses with the external Branches of the Tibialis Antica.

The continuation of the Trunk, sometimes termed *Fibularis* vel *Peronea, Posterior*, descends behind the Malleolus Externus, to the outer and back part of the Foot, anastomosing with the External Malleolar and Tarsal Branches of the Tibialis Antica.

### TIBIALIS POSTICA.

The TIBIALIS POSTICA, properly so called, analogous to the Ulnaris, passes down at the back part of the Tibia, and runs over the Tibialis Posticus and Flexor Digitorum, and under the Gastrocnemius Internus, in its descent through the Leg.

At the under part of the Leg it becomes more superficial, running between the Tendo Achillis and Malleolus Internus; having the Tibialis Posticus and Flexor Digitorum Longus on the inner, and the Flexor Longus Pollicis on the outer side of it.

From the Ankle, it runs in the hollow of the Os Calcis, between that Bone and the Abductor Pollicis, to the Sole of the Foot.

Its Branches supply the Muscles, Integuments, and Membranes, at the back and inner part of the Leg, and through the whole length of the Sole; forming many Inosculations with the Branches of the Anterior Tibial, and Fibular Arteries, on the different sides of the Leg and Foot. In the Deep-seated parts there are also many communications, by means of perforations in the Interosseous Ligament.

In its course along the Leg, it gives off—

*Numerous Branches*, similar to those of the Tibialis Antica, to the surrounding Muscles:

The *Arteria Nutritia Tibiæ*, which begins a little below the upper end of the Trunk, descends for some way in the Leg, and gives Branches to the deep Muscles and Membranes near it, and one Branch, termed *Arteria Medullaris*, which enters the Hole near the middle of the Bone:

*Several Branches* to the parts behind, and at the inner side of the Ankle and Heel, which communicate with others of the Anterior Tibial Artery.

The Trunk of the Artery divides in the hollow of the Os Calcis, at the place where it is about to go behind the Abductor Pollicis, into two principal Plantar Branches,—the *Internal* and *External Plantars*.

## PLANTAR ARTERIES.

The Plantar Arteries run forwards under the Aponeurosis Plantaris, having the Flexors of the Toes between them.

The PLANTARIS INTERNA, vel RAMUS INTERNUS, passes near the inner side of the Sole, between the Aponeurosis Plantaris and Abductor Pollicis; having the Muscle upon the inner side of it.

It gives *Branches* which run in a retrograde direction to the back part of the Ankle and adjacent parts of the Heel:

*Several Branches* from each side, which go forwards to the Muscles and Integuments, and to the Bones, Ligaments, and other parts at the concave edge of the Sole.

At the root of the Great Toe, it sends a *principal Branch* to its inner side; it then passes under the Flexor Longus Pollicis, and, after anastomosing with the Arcus Plantaris, gives off a *Large Branch* which splits into two,—*one* to the outer side of the Great Toe, and the *other* to the adjacent side of the Toe next it.

The PLANTARIS EXTERNA, vel RAMUS EXTERNUS, which may be considered as the continuation of the Trunk, being in general much larger than the Interna, —passes obliquely outwards between the Flexor Brevis Digitorum and Flexor Accessorius, till it reaches the Base of the Metatarsal Bone of the little Toe.

It is afterwards arched forward, between the Flexors and Metatarsal Bones of the small Toes, the Trunk being continued to the root of the Great Toe, under the name of *Arcus Plantaris.*

The External Plantar Artery sends off—

A *considerable Branch*, first to the under, then to the outer part of the Heel, which communicates externally with Branches of the Anterior Tibial and Fibular Arteries:

*Several Branches* to the Flexors of the Toes, and to other parts in the outer portion of the Sole; which communicate, on the inner side, with the Branches of the Plantaris Interna, and at the outer, with those of the Anterior Tibial Artery.

The Arcus Plantaris gives out—

*Several Branches* to the deep Muscles of the Sole, particularly,

*Rami Interossei* to the Muscles between the Metatarsal Bones:

A *Branch* to the outer side of the Little Toe:

*Three Large Digital Arteries*, which are forked at the roots of the Toes, and run along the edges of these in the manner the Digital Arteries do along the Fingers.

Between the Metatarsal Bones of the Great Toe and the one next it, the Plantar Arch anastomoses with the Posterior or perforating Branch of the Anterior Tibial Artery, forming a free communication between the Arteries of the upper and under side of the Foot. Frequently it sends off here a Digital Artery, which forks and runs along the outer side of the Great Toe, and inner side of the Toe next it, so as to supply the place of one of the Branches of the Internal Plantar Artery.

At the roots of the Toes, the anterior extremities of the Trunks of the Digital Arteries also form distinct Anastomoses with the Interosseous Arteries of the upper part of the Foot.

## VEINS.

The VEINS of the INFERIOR EXTREMITY, like those of the Superior, consist of a *Subcutaneous* and a *Deep* Set, and, like them also, are furnished with numerous Valves.

SUBCUTANEOUS VEINS.—The Subcutaneous Veins are situated between the common Integuments and general Aponeurosis, and, in many parts, are entirely concealed by the Fat. They anastomose frequently with each other by large Branches, and have several communications also with the deep-seated Veins.

They form two principal Trunks, called *Saphæna Major* and *Saphæna Minor.*

### SAPHÆNA MAJOR.

The SAPHÆNA MAJOR, begins upon the upper side of the Foot, runs over the fore part of the inner Ankle, and ascends in the Leg at the inner edge of the Tibia.

From the Leg, it passes up by the inside of the Knee, and afterwards from the inner to the upper and fore part of the Thigh.

It is at first composed of Veins, derived from the upper and inner part of the Dorsum Pedis, which have frequent Anastomoses with each other, and are of considerable size.

In its ascent, it is joined by Branches from the Superficial parts of the Leg, and some way below the Knee, is frequently split into a Plexus.

It receives Branches from the superficial parts of the Thigh, and small Twigs from the Inguinal Glands.

It perforates the Fascia Lata at the edge of the Falciform Ligament, and terminates in the top of the Femoral Vein, nearly opposite to, or a little higher than, the origin of the Arteria Profunda.

### SAPHÆNA MINOR.

The SAPHÆNA MINOR arises upon the outer side of the Foot, and afterwards passes behind the Malleolus Externus.

From this it ascends, in the back part of the Leg, upon the Surface of the Gastrocnemius Externus, and goes into the Ham.

It is formed originally by the Veins of the upper and outer part of the Foot, and is joined to the Saphæna Major, over the Metatarsal Bones, by one or more Arches, which receive a Plexus of Branches into their lower or convex part.

It is joined by the Superficial Veins of the outer and back part of the Leg, which have frequent Anastomoses with each other, and with the Branches of the Saphæna Major.

It terminates in the Vena Poplitea, and, a little above the Knee, communicates constantly by a small Branch with the Saphæna Major.

### DEEP VEINS.

The Deep Veins of the Leg, like those of the Forearm, run close at each side of their Arteries, and are double their number, but differ a little from the Deep Radial or Ulnar Veins, in being proportionally larger.

The TIBIAL and FIBULAR VEINS anastomose in some places with each other, and also communicate with the Subcutaneous Veins.

At the upper part of the Leg they are united together to form the Vena Poplitea, and the union is nearly at the same place where the corresponding Arteries come off.

The VENA POPLITEA adheres closely to the upper or posterior Surface of the Artery, being more superficial than the latter, which it in a great measure conceals, and is commonly single, excepting a small Vein which sometimes accompanies it, and communicates with it.

The Popliteal Vein receives the Venæ Surales and Articulares, and the Saphæna Minor; after which it forms the Femoral Vein.

### VENA FEMORALIS.

The VENA FEMORALIS receives the Veins which correspond with the perforating Branches of the Femoral Artery, and passes in through the Triceps, where the Artery comes out.

In the middle of the Thigh it lies deeper than the Artery, afterwards turning gradually to its inner side; and, at the upper part of the Thigh, is joined by the Vena Profunda.

The VENA PROFUNDA receives the Veins corresponding with the Branches of the Artery of that name, and is sometimes of a large size, being then in a great measure the continuation of the Vena Poplitea,—a small Vein only in such cases accompanying the Trunk of the Femoral Artery.

Besides the Vena Profunda, the Femoral Vein takes in small Veins from the External Parts of Generation, from the Inguinal Glands, and from the other superficial parts of the Groin;—and, in particular, it receives a Branch of considerable size, which descends from the Integuments of the fore side of the Abdomen, and is often very conspicuous in cases of Ascites.

### Iliac Veins.

The Trunk of the Femoralis, having received the different Veins of the Inferior Extremity, passes into the Abdomen, behind Poupart's Ligament, still situated at the inner side of the Artery, the two vessels being here upon the same plain,—after which it forms the Iliaca Externa.

The Iliaca Externa receives into its beginning the Epigastrica and the Circumflex Vein of the Os Ilium, and sometimes the Vena Obturatrix.

It is situated at the inside of the External Iliac Artery, and afterwards crosses behind it on the right, and behind the Internal Iliac Artery on the left side of the Pelvis, to join the Trunk of the Hypogastric Vein.

The Vena Hypogastrica, vel Iliaca Interna, is situated at the outer side of the Concomitant Artery, and receives the different Veins which correspond with the Branches of that Artery, and which are furnished with Valves where the are situated among they Fleshy parts of the Pelvis.

The External and Internal Iliacs unite, and form the Common Iliacs, a little below the division of the corresponding Arteries.

The ILIACÆ COMMUNES ascend by the right side of their respective Arteries, and a little below the Bifurcation of the Aorta,—or upon the fore part of the Fifth Lumbar Vertebra,—unite to form the Inferior Cava, situated, as formerly mentioned, at the right side of the Aorta.

### VENA CAVA INFERIOR.

The VENA CAVA INFERIOR, which is much larger than the Cava Superior, and greatly exceeds in size the descending *Aorta*,—receives, at its beginning, the Vena Sacra, and higher, the Venæ Lumbares, which last, in the left side, pass behind the Trunk of the Aorta.

It likewise receives the Venæ Renales, and the Spermatica of the right side.

At length it takes in the Venæ Hepaticæ and Diaphragmaticæ, and, perforating the Tendinous part of the Diaphragm, at the root of the Liver, it terminates in the under part of the Right Auricle of the Heart; thus receiving the Blood from the Inferior Extremities, from the Viscera and Parities of the Abdomen, or from all the parts situated under the Diaphragm.

TAB. 159.

Fig. 1

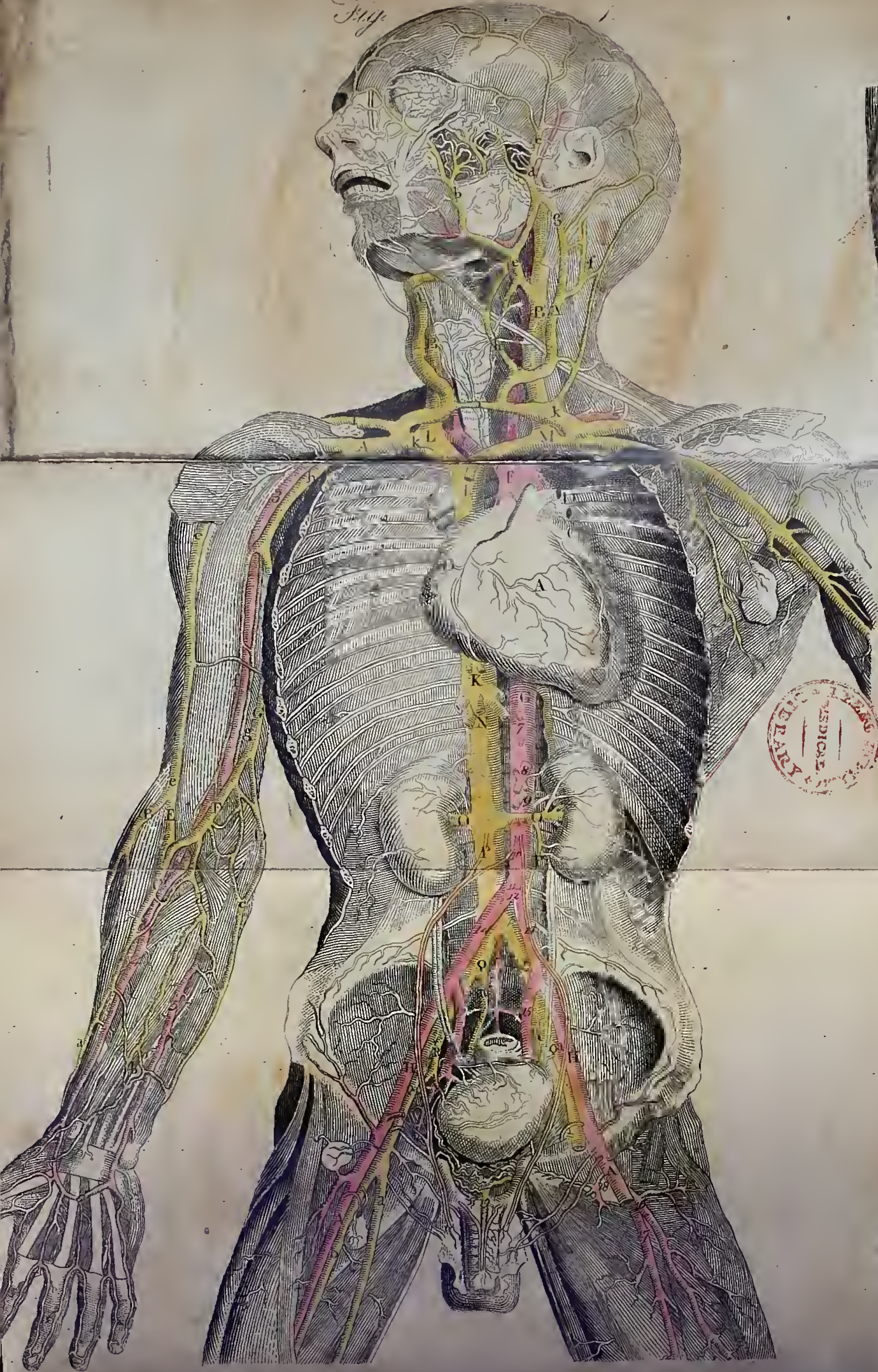
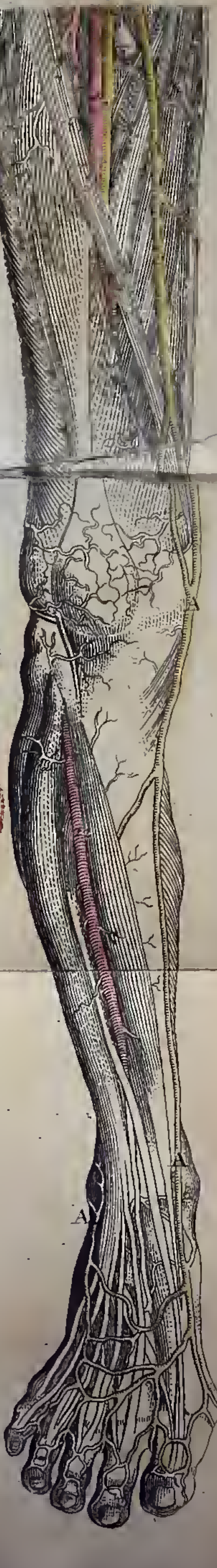


Fig. 2.



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# TABLE XXIX.

GIVES a GENERAL VIEW of the ARTERIAL and VENOUS SYSTEMS.

## FIG. 1.

### HEAD *and* NECK.

*a*, The frontal vein.
*b*, The facial vein.
*c*, The temporal vein.
*d*, The trunk of the temporal vein, where it lies behind the parotid gland, and receives the transversalis faciei.
*e*, The common trunk formed by the facial and temporal veins, opening into,
B, B, The internal jugulars.
*f*, The occipital veins.
*g*, The external jugular, arising from the temporal vein.
*h*, The anterior external jugular vein.
A, A, The external jugular veins, descending, and communicating by,
*i*, A cross branch at the bottom of the neck.
*k*, *k*, The termination of the external jugulars in the subclavian veins.
2, The left carotid artery ascending at the inner side of the internal jugular vein, and at the place of its division sending off the superior laryngeal artery.

### SUPERIOR EXTREMITY.

1, The trunk common to the right carotid and subclavian arteries.

3, 3, The subclavian artery on the left, and humeral artery on the right side.

4, The radial, and,

5, The ulnar artery.

6, The superficial palmar arch, the radial part of which in this figure larger than usual.

*a*, *b*, *d*, The median veins.

*c*, The superficial ulnar vein.

B, The cephalic vein.

D, The basilic vein.

C, The mediana longa, divided into,

E, The mediana cephalica, and,

F, The mediana basilica.

*e*, *e*, The cephalic vein, ascending and getting between the pectoral and deltoid muscles.

G, The basilic vein passing along the inner side of the arm, and terminating in the axillary vein.

*f*, *g*, The venæ concomites of the humeral artery.

*h*, The axillary vein.

*i*, The termination of the cephalic.

A, The subclavian vein.

## TRUNK.

A, The heart, with the coronary vessels.

B, The right, and,

C, The left auricle.

D, E, The pulmonary blood-vessels.

F, The arch of the aorta.

G, The aorta descendens.

7, The origin of the diaphragmatic,

8, Of the cœliac,

9, Of the superior mesenteric,

10, Of the spermatic, and,

11, Of the inferior mesenteric arteries.

12, The division of the aorta into the two common iliacs.

13, The sacra media, passing behind the intestinum rectum.

14, 14, The common iliac arteries.

H, H, The external iliacs.

15, 15, The internal iliacs.

I, The vena cava superior.

K, The vena cava inferior.

*k*, The termination of one of the internal mammary veins.

L, M, The great subclavian veins, the left longer than the right.

N, The termination of the hepatic veins.

O, O, The renal veins, with their corresponding arteries.

P, P, The spermatic veins.

Q, Q, The common iliac veins.

Qa, Qa, The external iliac veins.

R, R, The internal iliac veins.

19, The vena magna penis, forming a plexus of veins at the neck of the bladder.—At the sides of the vein the arteries appear.

S, S, &c. The intercostal vessels.

### INFERIOR EXTREMITY.

A, A, The femoral arteries, the left one cut.

16, The circumflexa externa.

17, The profunda femoris.

18, The circumflexa interna.

*a*, The vena saphena major.

*b*, The femoral vein.

## FIG. 2.

20, The continuation of the femoral artery.

21, The corresponding vein.

22, The anterior tibial artery.

A, A, A, The vena saphena major.

Aa, The beginning of the saphena minor.—Upon the foot and toes a plexus of veins appear, which terminates in both the saphenæ.

# PART VI.

## OF THE

## ABSORBENT SYSTEM.

## OF THE

# ABSORBENTS IN GENERAL.

The *Absorbent System* consists of the *Absorbent Vessels* and *Conglobate Glands*; the former of which are divided into *Lymphatic* and *Lacteal Vessels*, on account of the colour and nature of their Contents.

The *Absorbents* are small *Pellucid Tubes*, which have been discovered in most parts of the Body, and are supposed to exist in all.

### ORIGIN AND SITUATION OF THE ABSORBENTS.

The Absorbents begin by numberless open *Mouths*, too minute to be visible to the naked Eye: by the assistance of Glasses, however, the Orifices of the Lacteals have been seen in the Human Body;—and those of the Lymphatics in certain kinds of Fishes.—*See* MONRO'S *and* CRUIKSHANK'S *Treatises on this Subject.*

They arise from the External Surface of the Body, from the Cellular Substance, from the Surfaces of the large Cavities, and from the Surface and Substance of the different Viscera; but have not yet been distinctly observed in the Cavity of the Cranium and Spine, nor in the Placenta and its Membranes.

In the different parts of the Body, they generally run in two Sets; one Superficial and very numerous, the number being much greater than that of the red Veins, the other accompanying the Arteries, and at least double their number.

In general, they have a waving direction, and form an irregular *Net-work*, having frequent communications with each other; and these are most numerous in the vicinity of their Glands.

## LACTEAL VESSELS.

The Lacteals are of the same nature with the other Absorbents. They begin from the inside of the Intestines; and when these contain Alimentary Matter, the Lacteals carry a white Fluid, called *Chyle*, which, on account of the thinness of their Coats, readily appears through them. At other times, they carry a *Clear Fluid* or *Lymph*, to be mixed with the contents of the Lymphatics.

In the Human Body, and in Quadrupeds, the Chyle has the appearance of Milk. It has a sweet and somewhat saline taste. By allowing it to remain at rest for some time, and exposed to the Air, it is said to afford Cream, and also to coagulate. It is found to contain Albumen, Serum, and different kinds of Salts, and, according to some, Saccharine Matter.

Where a Person has died a few hours after taking too great a quantity of Food, the Lacteals have been observed gorged with Chyle; and, upon opening the Abdomen of a Dog, &c. three or four hours after the Animal has taken Food, the Lacteals are found full of this Fluid. At longer periods than that just mentioned, the whiteness of the Fluid diminishes; and where the Animal has fasted twenty-four hours, the contents of the Lacteals are colourless.

### GENERAL TERMINATION OF THE ABSORBENTS.

Most of the Lymphatics, and all the Lacteals, terminate in the Thoracic Duct, by which the Lymph and Chyle are conveyed to the Red Veins, and mixed with the Blood.

The large Veins in the bottom of the Neck are the common place of termination; no facts nor observations having been yet established, of their terminating in any other part of the Venous System.

### COATS OF THE ABSORBENTS.

The *Coats* of the Absorbents are thinner and more transparent, but stronger than those of the Red Veins, being able to support a column of Mercury of considerable weight;—but, from their thinness, they cannot be enumerated.

The Absorbents, however, like the Blood-vessels, are generally supposed to be formed of different *Membranous Layers.*—Fibres can be seen in them, and their Muscularity is rendered probable by the contractile power which they are observed to possess in a living, or Moribund Animal.

By this contractility, together with a degree of elasticity they possess, they convey their contents from their Origins towards their terminations, in which they are assisted by the motions of the surrounding Muscles, and pulsations of the neighbouring Arteries, independent of such a *Vis a Tergo* as contributes to propel the Blood through the Veins.

## Blood-vessels and Nerves of the Absorbents.

The Absorbents are furnished with *Blood-vessels* for their nourishment, as is sometimes distinctly observed by throwing penetrating Injections into them; and this is rendered still more evident, by their being susceptible of inflammation.

The presence of *Nerves* also appears probable, from the acuteness of their feeling when in a state of inflammation.

## Valves of the Absorbents.

Through their whole extent, they are intercepted by *Valves*, which, like the sides of the Vessels to which they belong, are of great proportional strength. They are placed in pairs, and are of a semicircular form; having one edge of each Valve fixed to the side of the Vessel, and the other edge loose across its Cavity, but turned towards the general terminations, being quite similar to the Valves of the Red Veins.

In some parts, the Valves are found to be situated at equal distances; in others, more irregularly.—Their number also is very uncertain, amounting in some parts to three or four, and in others to seven or eight pairs, or upwards, in the length of an inch;—but varying still more with respect to number in different Bodies, and in different parts of the same Body. Sometimes there is not above a single pair in the space of an inch.

When the Absorbents are distended, they appear largest on the side of the Valves towards their general terminations, and the enlargements are such as to give the Lymphatics a jointed, and the Lacteals frequently a Vesicular appearance.

In the termination of the Absorbents, whether in the Thoracic Duct or in the Red Veins, there is always one, and commonly two Valves, to prevent the contents of the Duct or of the Veins from passing into them.

The Valves promote the general course of the Lymph and Chyle, and prevent the retrograde motion of these Fluids within their Vessels.

## USE OF THE ABSORBENTS.

The Lymphatics take in the Fluids applied to their Orifices by Capillary Attraction, and afterwards by a power inherent in themselves, and, by their contractile nature, conduct them into the Mass of Blood, whereby they prevent Morbid Accumulations.—They absorb the thinner parts of the secreted Fluids, so as to give them a proper consistence, and take up solid parts originally formed for temporary purposes, to make way for others that are to be more permanent, &c. The Lacteals, in a similar manner, receive the Chyle from the Intestines, for the nourishment of the Body.

### Glands of the Absorbents.

The Glands of the Absorbents, or *Conglobate Glands*, are found solitary or in groups in various parts of the Body, and are situated in the Cellular Substance under the Skin, generally near the great Blood-vessels, or over the Trunks of the Vessels belonging to the different Viscera; but scarcely can be said to be placed in the Substance, or upon the Surface of any of the Viscera. They are chiefly found at the bendings of the Knee and Thigh; about the Vessels in the Pelvis; between the plies of the Mesentery, where they are in greater abundance than in any other part of the Body; about the Vessels going to the other Viscera of the Abdomen; about the Vessels in both Mediastina, especially the Bronchi; at the inner part of the Arm; in the Axilla; about the large Vessels of the Neck; under the Lower Jaw; before and behind the Ear. They have not yet been found upon the Hands or Feet, nor in the Cavity of the Cranium; and scarcely have any ever been observed upon the Fore-arms or Legs; and only a small straggling Gland is occasionally met with upon the superficial parts of the Trunk of the Body. This is seen about the size of the Crystalline Lens, sometimes on the back, at other times on the fore side of the Thorax.

They are of a round or oval form, and frequently a little flattened; and of different sizes, from that of a Millet-seed to that of a Substance near an inch in diameter; sometimes several are collected into one Mass.

Their colour also varies in different parts of the Body, and at different times of life.

In young Subjects, they are generally largest, and of a reddish or brown colour, but become smaller and paler with increasing age; and immediately under the Skin, they are redder and firmer than within the large Cavities.

In the Mesentery, they are of a pale colour; about the Bronchi, they are almost black.

They have a smooth, dense, *Membranous Covering*, which gives them a shining appearance, and are connected to the surrounding parts by loose Cellular Substance.

Their Coat is connected to the Glandular part by a Cellular Membrane, which, according to Dr Haller, is pervaded by a *Succus Proprius* full of Globules, which, Mr Hewson supposed, afterwards form the red Globules of the Blood.

Like other Glands, they are supplied with Arteries, Veins, and Nerves, which they derive from those of the adjacent parts.

They are described by some Anatomists as being composed of *Cells internally*, while others consider them as a *Congeries of convoluted Absorbent Vessels.*—Most of the Glands have much of the former, but many of them of the latter appearance.

The Absorbents entering into the Glands, are called

*Vasa Inferentia.* When they approach, or come in contact with the Gland, they split into radiated Branches, which, after spreading out upon it, penetrate into its Substance, where they divide almost to infinity, in some parts coiling up upon themselves; then they rejoin, and pass out at the opposite side.

The greater part of the Absorbents, approaching a Gland, terminate in it in this manner, while others turn aside or go over it, and terminate in other Absorbents, or in other Glands, but at such a distance, that virulent matter may enter the mass of blood without being at first perceived.

From the opposite side of the Glands, the Vessels go out nearly in the manner they entered them, and are there termed *Vasa Efferentia.* These are frequently, though by no means always, fewer in number, but larger than the *Vasa Inferentia.*

Most of the Absorbents go through several Glands, but in some parts through one only, before they reach their general terminations. Few appear to enter the Red Veins without previously having penetrated one or more Glands.

The Lymph and Chyle are strained through the Glands, by which they are supposed to undergo certain changes,—but the nature of these changes has not yet been ascertained, though they are found to be as essential to the Absorbent Vessels as the Ganglia are to the Nervous System.

## PARTICULAR ABSORBENTS.

### ABSORBENTS OF THE LOWER EXTREMITY.

THE *Superficial Absorbents of the Lower Extremities* consist of numerous Vessels, which are imbedded in the Cellular Substance, between the Skin and Muscles.

They belong to the Integuments in general, and are much more numerous than the Subcutaneous Red Veins.

They can be traced from the Toes, round which they form a Plexus.

From the Toes several Branches, likewise forming a Plexus, run over the top of the Foot, to the inner part of the Leg, and from that along the corresponding part of the Knee.

From the outer part of the Foot, another Plexus arises, which runs along the outside of the Leg, where it splits into two divisions, one of which crosses obliquely over the fore part of the Tibia, to the Lymphatics at the inner side of the Knee.

The other division passes partly to the Popliteal Glands, some ascending upon the outer and back part of the Thigh.

The Popliteal Glands are commonly two or three in number, and situated near the Artery of the same name; but frequently they are so small, and so much buried in Fat, as to be discovered with difficulty.

From the Sole another Plexus of Lymphatics arises, and joins those upon the Leg already described.

From the inside of the Knee a Plexus runs up, consisting of from twelve to twenty Trunks, which pass afterwards on the fore and inner part of the Thigh to the Groin.

The greater part of the Trunks of the last Plexus accompany the *Vena Saphæna Major*, and, in their passage, they receive many small Branches from the outer and back part of the Thigh.

In the Groin, they split into Branches, which penetrate the Inguinal Glands.

The *Inguinal Glands* are generally from six or eight to a dozen in number, and are of very different sizes; but sometimes the number is smaller, in consequence of two or more of them being united into one large Gland.

Of the Inguinal Glands, some lie in the Angle between the Thigh and Abdomen, and others a few inches farther down on the fore part of the Thigh.

The greater number are placed upon the outer part of the Tendinous Aponeurosis, the rest deeper, being in contact with the Great Blood-vessels.

The *Superficial Lymphatics of the Thigh* enter the lowest of these Glands; one or more of them, however, frequently pass the first Glands they meet with, and penetrate others higher in the Groin; and sometimes a few do not enter any Glands till they go into the Abdomen. The Superficial Lymphatics of the upper and back part of the Thigh, and of the Nates, Abdomen, and Loins, also enter into the Inguinal Glands.

The *Deep-seated Lymphatics of the Lower Extremity*, are situated among the Muscles.—They accompany the

Blood-vessels,

Blood-vessels, and are few when compared with the Subcutaneous Set.

In several places, one only has been yet observed on each side of the Trunks of the Arteries, though in others they are somewhat more numerous, forming a Plexus over the Blood-vessels.

They arise from the sides of the Toes, and from the deep parts of the Sole, accompanying the Plantar Arteries; and, after reaching the Leg, they run up with the Posterior Tibial Artery to the Ham.

In the Ham, they lie close upon the Trunk of the Artery, and enter the Popliteal Glands.

Besides these, there are similar but smaller Lymphatics, which begin upon the upper part of the Foot, and afterwards accompany the Anterior Tibial, and the Fibular Arteries, receiving Branches from the deep parts of the fore and outer side of the Leg.

The *Anterior Tibial* and the *Fibular Lymphatics*, terminate with the Posterior Tibial in the Glands of the Ham.

From the Popliteal Glands, two and sometimes more Trunks of considerable size are sent out, which accompany the Femoral Artery, and, at different distances, communicate with each other, by Branches which pass obliquely across the Artery.

At the upper part of the Thigh, they enter the undermost of the Inguinal Glands, where the Lymph of the Superficial and deep-seated Absorbents of the Limb is mixed and incorporated.

### ABSORBENTS OF THE EXTERNAL PARTS OF GENERATION.

The *Superficial Lymphatics of the Scrotum* enter the upper and inner Inguinal Glands; those deeper seated passing with the Lymphatics of the Testicle into the Abdomen.

The *Superficial Lymphatics of the Penis* begin at the Prepuce, and form a few Trunks which run principally upon the Dorsum Penis, receiving in their passage Branches which turn round from its Inferior Surface.

In some Subjects, they unite into Trunks in the middle of the Dorsum Penis, which afterwards separate into right and left parts.

In others, they are unconnected; and in all, they appear to divide at the root of the Penis into right and left Branches, which pass into the corresponding Inguinal Glands, that lie next the Symphysis Pubis.

The *Deep-seated Lymphatics of the Penis* arise from the Glans, and from the Body of the Penis, and accompany the Arteries into the under part of the Pelvis.

The *Lymphatics of the Testicle* are numerous, and are among the largest of the Body; some of them exceeding the size of a Crow-quill.

They arise from the Coats and Substance of the Testicle, and from the Epididymis, and run with the Spermatic Cord through the Abdominal Rings, to terminate in the Lumbar Glands.—In their passage they have few communications with each other.

The *Lymphatics of the External Parts of Generation in Women*, go partly to the Inguinal Glands of each side and partly through the Abdominal Rings, in company with the Round Ligaments of the Uterus, and terminate in the Iliac, and in the Lumbar Glands.

### Superficial Absorbents of the Abdomen and Loins, with the different Absorbents of the Nates.

The *Superficial Lymphatics of the under part of the Abdomen*, and those of the *Loins*, pass into the Inguinal Glands; each set terminating in such of the Glands as lie nearest the parts to which the Vessels belong. Of the Absorbents of the Nates, some go to the Glands of the Groin, but the greater number pass into the Pelvis with the Gluteal and Sciatic Blood-vessels, and terminate in the Iliac Glands.

### Inguinal, Iliac, and Lumbar Absorbents.

The Inguinal Glands, having received the Lymphatics of the Inferior Extremity, and likewise the Superficial Lymphatics of the External Parts of Generation, send out Trunks, fewer in number, but considerably larger than those which enter the Glands.

The Vasa Efferentia of the Inguinal Glands enter the Abdomen under Poupart's Ligament, in company with the Inguinal Artery and Vein.

Some of them go into the Glands situated about the Iliac or the Lumbar Blood-vessels. The *Iliac Glands* are frequently almost as numerous as the Glands of the Groin, and one of them is generally found larger than the rest, and placed at the inner edge of Poupart's Ligament. The Lumbar Glands are more numerous than any of the classes already described, and are placed over the Abdominal Aorta, Inferior Cava, and Bodies of the Lumbar Vertebræ.

The rest of the Lymphatics from the Lower Extremity descend at the side of the Pelvis, near the Internal Iliac Blood-vessels, and pass through some of the Glands which are situated there.

The last-mentioned Lymphatics are joined by Absorbents from the Viscera of the Pelvis in general, especially by those of the Bladder and Vesiculæ Seminales in the Male, and by a portion of those of the Uterus and of the Vagina in the Female.

Besides the Lymphatics which lie on the inside of the External Iliac Artery, there are others situated on the outside of it, upon the Psoas. Of these one part passes up to the Lumbar Plexus, and goes under the Aorta in different Branches which terminate in the Thoracic Duct.

Another part passes under the Iliac Arteries, and appears upon the Os Sacrum, forming a remarkable Plexus which goes through many Glands, and is chiefly situated behind the Aorta and Vena Cava.

### ABSORBENTS OF THE BLADDER OF URINE.

The *Lymphatics of the Bladder*, in both Sexes, accompany the principal Blood-vessels of that Organ, pas through some small Glands upon the side of it, and, a the under part of the Pelvis, go into the Glands which surround the Internal Iliac Artery and Vein.

ABSORBENTS

## ABSORBENTS OF THE UTERUS.

The *Lymphatics of the Uterus* run in two sets. One, which is the largest, goes with the Hypogastric, the other with the Spermatic Blood-vessels.

The *Hypogastric Lymphatics* form a Plexus which runs from above downwards, into Glands situated on the ides of the Vagina. From these Glands they pass to others which surround the Internal Iliac Vessels, and hen, intermixing with the Trunks from the Extremities, hey terminate in the Thoracic Duct.

The Spermatic Lymphatics terminate in the Lumbar Plexus.

The Lymphatics of the Uterus, like its Blood-vessels, are much enlarged, and of course easily discovered, in he Gravid state, where they are also observed to be exremely numerous.

## ABSORBENTS OF THE STOMACH.

Of the Absorbents of the *Stomach*, one Set runs upon ts Small, and another upon its Great Curvature; but neither the one nor the other are found to carry Chyle, hough a few Absorbents have been observed filled with t in other Animals,—as the Dog.

The first Set, composed of Branches from the upper and under Surfaces of the Stomach, accompany the Superior Coronary Artery.

In their passage, they go through a few small Glands situated at the junction of the Omentum Minus with the

Stomach, and, after becoming larger, they enter other Glands in company with the Deep-seated Lymphatics of the Liver, along with which they terminate in the Thoracic Duct.

The other Set pass from the Great Curvature of the Stomach, partly to the right, and partly to the left side, and, as on the Small Curvature, are formed of Branches from its opposite Surfaces.

Those on the left side receive the Lymphatics of the middle and corresponding half of the Omentum Majus; running to the left side of the Large Curvature of the Stomach, and passing through one or two small Glands on it, they go with the Lymphatics of the Spleen and Pancreas to the Thoracic Duct.

Those of the right side receive the Lymphatics of the corresponding half of the Great Omentum, and also pass through some small Glands which lie close to the Right Gastric Artery.

In their descent by the Pyloris, they meet the Plexus which accompanies the Superior Coronary Artery, and run with them, and with the Deep Lymphatics of the Liver to the Thoracic Duct.

## LACTEALS OR ABSORBENTS OF THE SMALL INTESTINES.

The *Lacteal Vessels*, so called from conveying a Fluid of the colour of Milk, begin upon the inner Surface of the Intestines. Each Lacteal takes its origin upon one of the Villi by numerous short radiated Branches, and each Branch is furnished with an Orifice for imbibing the Chyle.

The Radiated Branches are collected into Fasciculi, which are inclosed in Processes of the Inner Coat of the Intestines. These Fasciculi are of a roundish form, and have been called *Ampullulæ* of LEIBERKUHN, from that Author considering them as little Bottles receiving the Chyle.

From the Villi, the Lacteals run a considerable way under the Muscular Coat of the Intestines, and then pass obliquely through it, uniting in their course into larger Branches.

They follow the direction of the Blood-vessels, and their Trunks are double the number of the Arteries,—one being situated on each side of an Artery.

Upon the Surface of the Intestines an external Set appear. They run between the Peritoneal and Muscular Coats, and commonly proceed some way in the direction of the Intestine, and with few Ramifications.

The Superficial and Deep-seated Lacteals communicate freely in the Substance of the Intestines, and, after leaving them, commonly form a Plexus, which runs between the plies of the Mesentery and Meso-colon, without following particularly the course of the Blood-vessels.

The *Lacteals of the Jejunum* are larger and more numerous than those of the *Ilium*; the principal part of the Chyle being contained in the former.

In their course, they pass through a great number of Lacteal or Mesenteric Glands, which, like the Lacteals themselves, are largest and most numerous in that part of the Mesentery which belongs to the Jejunum.

The *Mesenteric Glands* are seated in the Fat, between the Layers of the Mesentery, near the Branches of the Blood-vessels.

They are commonly scattered over the Mesentery, at a little distance from each other; but there are seldom any observed within two or three inches of the Intestines.

They are of different sizes in different parts of the Mesentery, some being about half or two-thirds of an inch in diameter, while others are so small as to be traced with difficulty.

Their Structure is the same with that of the Absorbent Glands in other parts of the Body, but they are generally flatter, and are of a pale colour. When filled with the Chyle, they are almost as white as the fluid contained in them.

They are considered by some Authors as dividing the Lacteals into different orders.

From the Intestines to the Glands, the Lacteals are called *Vasa Lactea Primi Generis*, and from the Glands to the Thoracic Duct, *Vasa Lactea Secundi Generis.*

Some divide them into three orders;—the first consisting of those which go from the Intestines to the Glands,—the second, of those which run from one Set of Glands to another,—and the third, of those which pass from the Glands to the Thoracic Duct.

The *Lacteals of the Small Intestines*, after passing through the different Glands in the Mesentery, form at last one, and frequently two, three, or more Trunks, which accompany the Trunk of the Superior Mesenteric Artery, till they arrive at the right side of the Aorta, where they sometimes pass into the beginning of the

Thoracic Duct, at other times they descend a little, and join the Trunks from the Inferior Extremities, to form that Duct.

## ABSORBENTS OF THE GREAT INTESTINES.

The Absorbents of the *Great* are proportionally of an inferior size to those of the *Small Intestines*, and have seldom, though sometimes, been observed to be filled with Chyle.

In their course, they go through the Meso-colic Glands, which are situated between the Layers of the Meso-colon, but are generally much less numerous than those of the Mesentery, and also considerably smaller than them, or than most of the other Conglobate Glands of the Body.

The Absorbents of the *Cæcum*, and of the *Right Portion of the Colon*, join those of the Small Intestines, about the root of the Mesentery.

Those of the *Left Portion of the Colon* accompany the Inferior Mesenteric Artery, and communicate with large Lymphatics near its root.

They terminate at last in the Lumbar Glands, or go directly into the lower part of the Thoracic Duct.

The *Absorbents of the Rectum* go first into small Glands which lie between it and the Os Sacrum, and afterwards terminate in the Lumbar Plexus of Glands and Vessels.

## ABSORBENTS OF THE LIVER.

The *Lymphatics of the Liver*, like those of the other

Viscera, run in two sets; the Superficial Set are numerous, and unite into Trunks in the manner Roots unite to form the Trunk of a Tree.

The Superficial and Deep Sets communicate so freely, that upon injecting the Lymphatics of the External Surface, the Deep-seated Absorbents are readily filled from them.

The principal part of the Lymphatics upon the convex Surface of the Liver, go by a Right and Left Plexus towards the Suspensory Ligament.

Running along this Ligament, they directly perforate the Diaphragm, after which they pass through Glands situated upon the anterior part of the Pericardium.

Other Lymphatics from the convex part of the Liver run towards the Lateral Ligaments, where they form on each side one or more Trunks of considerable size.

From the Lateral Ligaments they pass through the Substance of the Diaphragm, and afterwards run forwards on its convex Surface, following the direction of the Ribs.—Not unfrequently these Vessels, instead of perforating the Diaphragm, run downwards, and terminate in the Thoracic Duct, within the Abdomen.

In their course upon the Diaphragm, they often send Branches backwards, which terminate in Glands upon the Esophagus.—In other instances, these Branches are observed to go directly into the Thoracic Duct.

They receive Branches from the Substance of the Diaphragm, and, after perforating two or three Glands upon its Surface, they join the Trunks from the Ligamentum Suspensorium.

The Lymphatics from the Lateral Ligaments, joined by those from the Ligamentum Suspensorium, form either a principal Trunk, or a Plexus, which runs up, sometimes between the Layers of the Anterior Mediastinum, and at other times in company with the Internal Mammary Blood-vessels on each side.

When they run in the Anterior Mediastinum, they most frequently terminate in the upper end of the Thoracic Duct:—sometimes, however, they communicate with the general termination on the right side of the Neck.

When they accompany the Internal Mammary Vessels, they are observed to terminate, the left in the Thoracic Duct, and the right in the general termination of that side.

The Lymphatics on the concave Surface of the Liver run towards the Porta, and join the Deep-seated Set. —One part of them goes over the under Surface of the Gall-bladder, from which they derive numerous small Branches.

The Deep-seated Lymphatics accompany the Blood and Biliary Vessels, and, communicating with the Superficial Absorbents already mentioned, pass through several Glands situated about the Trunk of the Vena Portæ, and terminate in the Thoracic Duct near the root of the Superior Mesenteric Artery.

### ABSORBENTS OF THE SPLEEN.

The Superficial Lymphatics of the Spleen are remarkably small. They pass from its convex to its concave Surface, where they join the Deep-seated Lymphatics, which are very considerable in size and number.

The *Splenic Plexus* of Lymphatics accompany the Splenic Artery, and go through several Glands of a dark colour, scattered along the Surface of that Vessel.

The Lymphatics of the Spleen receive those of the Pancreas, which run into them in a transverse direction.

In their course, they unite with the Lymphatics of the Stomach and those descending from the under part of the Liver; and the whole of them, near the Head of the Pancreas, form a considerable Plexus. From this Plexus Branches are sent off, some passing over the Duodenum, and others under it, and all of them going into the Thoracic Duct, near the termination of the Lacteals.

## ABSORBENTS OF THE KIDNEY AND CAPSULA RENALIS.

The *Lymphatics of the Kidney* are seldom seen, excepting when it is enlarged or ulcerated; in which case they may sometimes be distinctly observed.

The Superficial Absorbents run from its outer towards its inner edge, where, meeting with those deep-seated, they commonly unite with them, and form a Plexus which accompanies the Renal Blood-vessels, after which they pass through some of the Lumbar Glands, and terminate in large Lymphatics near the Aorta.

The *Lymphatics of the Capsula Renalis*, which are numerous in proportion to its size, terminate in the Renal Plexus.

## THORACIC DUCT.

All the Absorbents already described, excepting those from the convex Surface of the Liver, terminate in the Thoracic Duct near its beginning.

The *Thoracic Duct*, at its under extremity, is formed by the union of three, or sometimes of more principal Trunks; the first of which is composed of the Lymphatics of the right, and the second of those of the left Inferior Extremity;—the third Trunk, or set of Trunks, belongs chiefly to the Lacteals.

These large Absorbents unite so as to form the Duct over the third Vertebra of the Loins.

Sometimes they unite upon the second Vertebra, where the Duct formed by them is twice or thrice as large in diameter as it is higher up.

Commonly it enlarges again upon the first Lumbar Vertebra, where it has generally been called the *Receptaculum Chyli*, and considered as the beginning of the Duct, being often found forming an oval, or Pyriform Bag, about the third of an inch in diameter.

These large Trunks which form the Thoracic Duct, lie close upon the Spine, those of the right side being placed below the Right Crus of the Diaphragm, and those of the left between the Aorta and Spine, while the Thoracic Duct itself lies at first behind the Aorta, but afterwards passes from it upwards and a little to the right side, till it gets before the first Vertebra of the Loins.

Here it is situated behind the Right Crus of the

Diaphragm, a little higher than the Right Renal Artery, from whence it passes upwards, and afterwards appears in the Thorax, upon the fore and right side of the Spine, between the Aorta and Vena Azygos, where it is supposed to be considerably assisted by the strokes of the Aorta in impelling its Fluids.

In the middle of the Thorax, it is smaller than elsewhere, being only about a line in diameter. After this it gradually enlarges, and, near its termination, is about an eighth or tenth of an inch over.

In the Thorax, it receives the Lymphatics of the Spatia Intercostalia, one or two of which accompany each of the Intercostal Arteries, and the whole go through small Glands placed near these Arteries, but most numerous about the sides of the Dorsal Vertebræ, where they form a sort of Chain.

Here, likewise, it receives Branches from the Esophagus and Lungs; the former of which is surrounded by a number of Glands, and by a remarkable and intricate Plexus of Lymphatic Vessels.

## ABSORBENTS OF THE LUNGS.

The *Superficial Lymphatics of the Lungs* form large Areolæ, which have smaller Areolæ within them; the larger Branches running chiefly between the Lobules, and the smaller passing over them in such a manner as to cover almost the whole Surface of the Lungs.

From the Surface they go to the root of the Lungs, where they pass through the Bronchial Glands, which have already been taken notice of in the description of the Lungs.

At this place they are joined by the deep-seated Lymphatics, which creep along the Branches of the Trachea and of the Pulmonary Blood-vessels.

Through the medium of the Bronchial Glands, the Lymphatics of the two sides of the Lungs communicate freely with each other.

Having left the Glands, the principal part of those from the Left Lung form a Trunk of considerable size, which terminates in the Thoracic Duct, behind the Bifurcation of the Trachea.

The rest of the Absorbents of the Left Lung pass through Glands behind the Arch of the Aorta, which are likewise common to the Lymphatics of the Heart. They run at last by a principal Trunk into the Thoracic Duct near its termination.

After leaving the Bronchial Glands, the Absorbents of the Right Lung form a few principal Trunks, one of which commonly ascends on the fore part of the Vena Cava Superior, and, running in a convoluted manner, opens into the Trunk which terminates in the Veins in the right side of the Neck.

The rest of these Trunks go into the Thoracic Duct, near the Bifurcation of the Trachea.

### Absorbents of the Heart.

The *Absorbents of the Heart* are small, but numerous, and form principal Trunks which accompany the Coronary Arteries, and, like them, the largest belong to the Left Ventricle.

From the side of the Right Coronary Artery, an Absorbent Trunk, which corresponds with it, passes over the Arch of the Aorta to a Gland commonly found behind the Origin of the Carotid Arteries.

From this Gland it goes afterwards to the general termination in the right side of the Neck.

The Lymphatic Trunk accompanying the Left Coronary Artery, is formed of two principal Branches.—One of these runs in the Groove between the Ventricles on the Superior Surface of the Heart: the other runs in a similar Groove on the under side of the Heart, and having reached the space between the Auricle and Ventricle, it turns round to join the former Branch near its corresponding Artery.

The Trunk runs next to a Gland placed behind the Pulmonary Artery, and behind the Arch of the Aorta and Root of the Trachea, which, with the others here situated, is common to the Absorbents of the Heart and Lungs.

This Trunk terminates at length in the upper end of the Thoracic Duct.

## Thoracic Duct continued.

The Thoracic Duct, after receiving numerous Lymphatics within the Thorax, and having reached as high as the third or fourth Dorsal Vertebra, passes obliquely over to the left side of the Spine, behind the Esophagus, and end of the Arch of the Aorta, or beginning of the Aorta Descendens, till it reaches the Left Carotid Artery.

After this, it emerges from the Thorax, and runs between the Longus Colli and Internal Jugular Vein, to about the Sixth Vertebra of the Neck.

It now makes a turn downwards, and, after descending near an inch, terminates in the upper and back part of the angle formed by the left Internal Jugular and Subclavian Veins.

Throughout its whole course, it has a waving appearance, and this becomes more conspicuous, in proportion as it is distended by Injection. Near the middle of the Thorax, it not unfrequently splits into two or more Branches, and sometimes forms a Plexus, the Branches of which again unite into a common Trunk a little higher up.

After emerging from the Thorax, it commonly divides into two parts, which unite again previous to the termination of the Duct in the Red Veins; and where there is no division, there is generally a Dilatation or Sac at the termination.

Sometimes there is one termination in the Angle formed by the Red Veins, and one or two in the Subclavian Veins, and now and then, though more seldom, in the Internal Jugular, near the Angle.

In a few instances, it has been found double through its whole length; one Duct going to the common place of termination in the left side of the Neck, and the other to the corresponding part in the right.

It has also, in a few very rare instances, been observed to terminate in the Veins in the right side of the

Neck, while a short Trunk, similar to that commonly found there, has terminated in the left side.

### ABSORBENTS OF THE SUPERIOR EXTREMITY.

The *Superior*, in a similar manner with the Inferior Extremity, has two sets of Lymphatics, one lying immediately under the Integuments, and belonging to the Skin and Cellular Substance under it, the other accompanying the principal Blood-vessels, and belonging to the deep-seated parts.

The Superficial Lymphatics of the Superior Extremity are numerous, and are readily seen in emaciated Dropsical Subjects.

They arise from the fore and back parts of the Fingers and Hand, by a considerable number of Branches, and form an extensive Plexus, upon the corresponding sides of the Fore-arm.

Those upon the anterior part of the Fore-arm run directly upwards to the Arm, while the Lymphatics on its back part separate into two sets; one of which passes obliquely over the Muscles on the Radius, and the other over those on the Ulna, to join the Lymphatics on the anterior part of the Fore-arm.

The Lymphatics of the Fore-arm run over the bending of the Elbow, and afterwards ascend upon the fore and inner part of the Arm; the greater number of them running near the Basilic Vein.

Some of them frequently pass through small Glands placed along the Humeral Artery, one of which is commonly found a little above the inner Condyle of the Os

Humeri, the rest somewhat higher; other Lymphatics do not appear to enter any Glands till they reach those of the Axilla.

A few Lymphatics accompany the Cephalic Vein, and receive Branches from the outer part of the Arm; and, after passing between the Pectoralis and Deltoides, penetrate Glands at the under side of the Clavicle.

Of the deep-seated Lymphatics, two commonly accompany each principal Artery in the Fore-arm; and these, uniting at the Elbow, form two principal Lymphatics, which accompany the Trunk of the Humeral Artery.

Having reached the upper part of the Arm, they enter the Axillary Glands, where they are joined by Lymphatics which come from the Mamma and lateral parts of the Thorax, after passing through small Glands placed upon the under edges of the Mamma and Pectoralis Major.

The Superficial Lymphatics of the containing parts of the Thorax, in general, with the Absorbents from the Integuments and Muscles of the Scapula, run in a radiated manner; those from the upper parts passing downwards, those from below going upwards, and those from the middle running in a transverse direction, to terminate in the Axillary Glands, each set entering the Glands of their respective side.

The *Axillary Glands* vary in number and size in different Persons: They are somewhat smaller, and fewer in number, than those of the Groin: They are generally surrounded by a considerable quantity of Fat, and are situated in the hollow between the Pectoralis Major and Latissimus Dorsi; adhering closely to the Trunks of the Axillary Blood-vessels and Nerves.

From the Axillary Glands large Branches go under the Subclavian Muscle, and form a Trunk, which, in the left side, commonly joins the Thoracic Duct near its termination. In the right side, it joins the short Trunk which forms the second General Termination of the Absorbent System. Sometimes this Trunk, proceeding from the Superior Extremity, terminates in the Subclavian Vein, at a little distance from the general termination.

Sometimes two Trunks arise from the Axillary Glands in each side, in which case one goes to the end of the Thoracic Duct, or the corresponding Trunk in the right side, while the other terminates in the Subclavian Vein.

## ABSORBENTS OF THE HEAD AND NECK.

The Lymphatics on the *outside of the Head* accompany the Blood-vessels, and pass through Glands in their way to the Neck.

Those accompanying the Temporal Artery go through small Glands connected with the Parotid Gland, and also through others situated immediately under the root of the Zygoma.

The Lymphatics which accompany the Occipital Blood-vessels penetrate one or two minute Glands placed a little behind the root of the Ear, and over the Mastoid Process of the Temporal Bone.

The Lymphatics proceeding from the different parts of the *Face*, accompany the Branches and Trunk of the Facial Artery.

Some of them pass through Glands situated upon the outside of the Buccinator, while the principal Trunks go through a number of large Glands placed upon the outer, and also at the under part of the Lower Jaw,—at the anterior edge of the Masseter,—and about the Inferior Maxillary Salivary Gland.

The Lymphatics from the *inner part of the Nose* run principally with the Internal Maxillary Artery, and pass through Glands situated behind the Angle of the Lower Jaw, where they are joined by those which belong to the inner parts of the Mouth.

The Lymphatics of the *Tongue*, and likewise of the *Muscles* and other parts about the Os Hyoides, enter the Glands placed behind the Angle of the Lower Jaw.

Lymphatics have been frequently searched for in the *Brain*, but their existence in that Organ is not yet fully ascertained; though rendered highly probable, from Lymphatics and Glands being occasionally found in, or immediately on the outside of the Passages of the Blood-vessels of the Brain,—from Swellings in the Lymphatic Glands of the Neck, following Diseases of the Brain,—from the Absorption of Water, which has sometimes happened in Hydrocephalous Cases,—from an appearance of Lymphatics having been by some, as MASCAGNI, observed upon the Surface of the Dura

Mater, and between the Tunica Arachnoides and Pia Mater, and—from their having been found on the Brains of Fishes.

From the Superficial and Deep Parts of the Head in general, the Lymphatics accompany the External and Internal Jugular Veins, and the Carotid Arteries; receiving at the same time Branches from the Larynx, Pharynx, Muscles, and other parts of the Neck; some of the Superficial Lymphatics of the Neck passing down to the Axillary Glands.

The principal part of these Lymphatics go along with the Internal Jugular Vein and common Carotid Artery, and, in their passage, form a remarkable Plexus, which goes through the numerous Glands seated near the Blood-vessels, composing a Chain, from which they are termed *Concatenatæ.*

The *Glandulæ Concatenatæ* are more numerous than any other set of Glands in the Body, excepting those which belong to the Mesentery.

The *Cervical Plexus* of Lymphatics, having passed through the Glandulæ Concatenatæ, and having received some Branches from the interior part of the Thorax and Axillary Glands, unite at the bottom of the Neck into a Trunk, and sometimes two, which, in the left side, enter the Thoracic Duct near its termination, and, in the right, go into the Trunk, which forms the general termination of that side.

## GENERAL TERMINATION OF THE ABSORBENTS IN THE RIGHT SIDE OF THE NECK.

The Trunk which forms the termination mentioned above, is only from a quarter of an inch to half an inch in length, but its size is not much less than that of the Thoracic Duct.

It is formed by Lymphatics from the right side of the Liver, Diaphragm, Heart, and the Right Lobe of the Lungs, by those of the Right Arm, right side of the Head, Neck, and Thyroid Gland; the Lymphatics of the left side of the Thyroid Gland forming a Trunk, which ends in the Thoracic Duct.

Besides this common termination, some of these Lymphatics occasionally open into the Internal Jugular or into the Subclavian Vein, at a little distance from the Angle formed by these two Veins.

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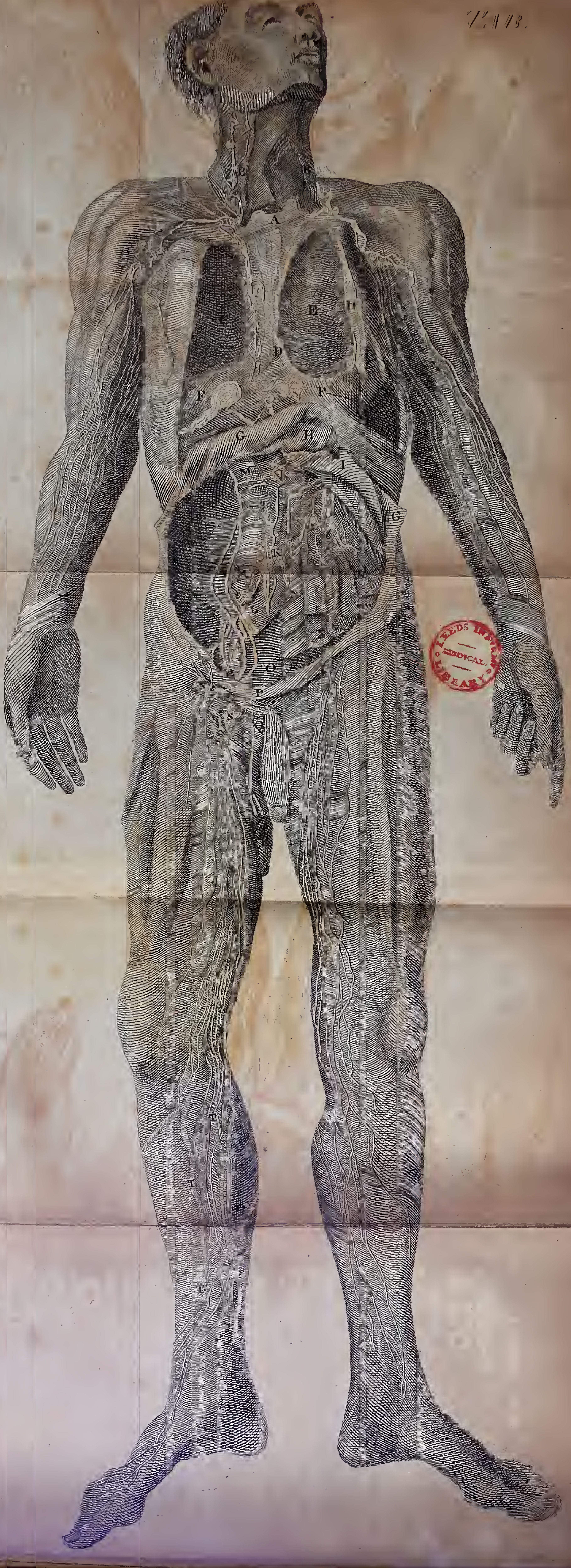

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# TABLE XXX.

GIVES a GENERAL VIEW of the ABSORBENT SYSTEM, after the LYMPHATICS and LACTEALS had been Injected with QUICKSILVER, the BLOOD-VESSELS with WAX, and the PREPARATION dried.

A, A section of the upper end of the sternum, and of the inner end of the clavicles, which are turned up.
B, B, The internal jugular veins, between which are represented the muscles, fat, &c. which cover the trachea.
C, The cavity of the right side of the thorax.
D, The pericardium cut.
E, The heart.
F, F, The convex surface of the diaphragm.
G, G, A flap formed by the integuments and abdominal muscles turned up.
H, Part of the liver.
I, The stomach and part of the colon shrivelled.
K, K, The descending aorta.
L, The right common iliac artery.
M, M, The inferior vena cava.
N, N, The mesentery and small intestines collected into folds, and turned to the left side.
O, The cavity of the pelvis.
P, The pubes.
Q, R, The spermatic cord and testicle.
S, S, S, The inguinal glands distended with quicksilver, and in part assuming a cellular appearance.
T, T, T, Branches of the vena saphena major.

### ABSORBENTS.

The course of many of the absorbents represented in this figure is so obvious, as to supersede the necessity of letters; viz.

Those upon the upper part of the feet, which take their origin from the toes.

Trunks behind the inner ankles, which ascend from the soles.

Lymphatics from the outside of the feet and ankles, running across the under part of the tibiæ, to the inside of the legs.

The principal lymphatics of the legs, running near the great venæ saphenæ.

Lymphatic trunks, going obliquely across the upper part of the tibiæ, to the inside of the legs.

The course of the principal lymphatics of the legs, running at the inner side of the knees.

A trunk from the inside of the right knee.

The principal lymphatics from the legs, passing along the inside of the thighs.

An irregular plexus formed by the lymphatics, in their course along the inside of the limbs in general.

The inguinal glands, receiving the lymphatics from the inside of the thighs, &c.

In the Right Side:—The inguinal glands, receiving lymphatics which run in a radiated manner from the fore part of the thigh upwards and inwards,—from the outer part of the pelvis inwards, and—from the under end of the superficial parts of the abdomen downwards.

Upon the Right Side of the Dorsum Penis:—Two Lymphatic trunks, one of which, at the pubes, splits into branches, which terminate partly in the uppermost, and partly in the innermost inguinal glands.

A few of many lymphatics injected from the testicle, passing along the spermatic cord.

At the Right Side of the Pelvis:—The iliac plexus of lymphatics, formed by trunks which ascend, some of them from the inguinal glands, behind POUPART'S *Ligament*, others from the spermatic cord, through the abdominal ring, and some from the contents of the pelvis, along with the iliac blood-vessels.

At the Bifurcation of the Aorta:—Lymphatics which come up from the surface of the os sacrum.

At the Sides of the Inferior Cava, and over the Aorta:—The vessels and glands which form the lumbar plexus.

Upon the Mesentery:—A few of many injected lacteals, directing their course towards the beginning of the thoracic duct.

U, Trunks descending from the under part of the liver, and from other viscera situated at the upper part of the abdomen, meeting with the lacteals and lumbar plexus, and terminating at this place in the thoracic duct.

V, A very large lymphatic gland upon the convex surface of the diaphragm, appearing as if formed of convoluted branches.

Large lymphatic vessels entering this gland, which perforate the diaphragm from the right side of the liver.

W, W, Lymphatics and glands placed at the under end of the anterior mediastinum, the vessels passing from the ligamentum hepatis latum, through the fore and middle part of the diaphragm.

X, X, &c The anterior thoracic plexus of lymphatic vessels and glands, which accompany the internal mammary blood-vessels, receiving the lymphatics from the convex part of the liver and diaphragm; the lymphatics of the right plexus running to the right general termination of the absorbent system, and those of the left plexus to the upper end of the thoracic duct.

Y, A lymphatic trunk from the mamma and adjacent parts of the thorax, entering glands near the axilla.

Upon the Superior Extremities :—An extensive plexus formed by the superficial lymphatics, which pass from the anterior side of the extremity upwards, and receive many branches which ascend in an oblique direction, from the opposite sides of the arm.

At the Axillæ :—The lymphatics of the superior extremities entering the axillary glands.

*a*, *a*, Principal trunks proceeding from the glands of the axillæ.

*b*, The principal trunk of the left arm, terminating along with the thoracic duct.

*c*, The thoracic duct receiving a lymphatic belonging to the neck, and terminating in the angle formed by the left internal jugular, and left subclavian veins.

In the Right Side of the Neck :—Some of the lymphatic vessels and glands which form the jugular plexus.

*d*, The general termination of the lymphatic vessels of the right side of the head and neck, right arm, &c. in the angle formed by the right internal jugular, and right subclavian veins.

N. B. *A much greater number of Absorbents were injected in the Preparation from which this Figure was taken, than are here represented;—none having been drawn excepting what could be distinctly seen, after the Preparation had been kept a considerable time in the dried state, and, of course, many Lymphatics so shrivelled as not to admit of accurate delineation.*

# PART VII.

OF

# THE NERVES.

## OF THE

# *NERVES IN GENERAL.*

The Nerves are firm, white Cords, which are generally considered as being directly continued from the Medullary Substance of the Brain and Spinal Marrow; —although instances have been frequently met with, where the Brain, and even the Spinal Marrow, have been found nearly obliterated in the Fœtus, and yet the Nerves retained their usual appearance.

They are composed of *Funiculi* closely connected, and each of these again of smaller *Fibrillæ*, which may be subdivided into parts so extremely minute, as almost to elude the naked Eye, but which may be readily seen by the assistance of the Microscope;—no Cavity, however, has been yet observed in them.

The *Medullary Part* of the Fibrillæ appears to be furnished with Cineritious Substance derived from their Pia Mater; in proof of which, they are observed to be in general of a browner colour than the Medullary Substance of the Brain, and larger in their course than at their supposed origin.—Monro's *Obs. on Nerv. Syst.*

The Medullary Substance of the Fibrillæ is *Pulpy* and tender, but rendered thicker and stronger by the coverings they receive from the Tunica Arachnoidea and Pia Mater while within the Bones, and more particularly by the additional covering given them by the Dura Mater upon their exit.

The Dura Mater, in its passage through the Base of the Cranium, and between the different Vertebræ, is connected by its External Surface to the Pericranium and Periosteum; while the inner part of it, together with the Tunica Arachnoidea and Pia Mater, is continued along the Nerves.

The *Involucra*, or *Coverings*, inclose each of the Nerves in general, and likewise the several Fibrillæ of which they are composed, whereby their size, as well as strength, is greatly increased.

The Nerves, soon after leaving the Bones, have the Dura Mater so intimately connected with them, that it has been considered, by some Authors, as degenerating into condensed Cellular Substance, notwithstanding it still retains the general appearance of the Dura Mater.

When the Membrane connecting the Fibrillæ of the Nerves is exposed to an Alkaline Solution, it appears like a bundle of hollow Tubes, the Medullary Matter being destroyed. This Substance is now known by the name of *Neurilema.*

Upon examining the Nerves, especially the small ones, in a living or recently dead Animal, they are observed to have numerous *White Lines* placed transversely, or in a serpentine direction.

When the Nerves are moderately stretched, this appearance becomes less evident; and when extended considerably,

siderably, or when macerated in Water, it vanishes entirely.

PROCHASKA, *(De Carne Musculari)*, supposes these serpentine Lines to be owing to a decussation of Vessels and Fibres of Cellular Substance straitening the Nerves.

DR MONRO considers them as Folds or Joints, allowing the Nerves to accommodate themselves to the various states of flexion and extension.

The Nerves are supplied with *Arteries* from the neighbouring Blood-vessels, to which they return corresponding Veins.

The Arteries, however, are small, and are injected with difficulty, excepting in the large Nerves, where they are more considerable, and where, after a minute Injection, the Nerve receives the colour of the Matter injected.

Upon dividing the Nerves, they are not found to possess much contractility; while the Arteries, upon being cut, are observed to retract very considerably.

They are generally lodged in the common Cellular Substance and Fat, and in the Interstices of the Viscera and Muscles, where they are protected from compression; though in several parts they are exposed to the hardness of Bones, or to the action of Muscles, over or through which they pass.

In their course through the different parts of the Body, they generally run as straight as is consistent with the nature of the particular part over which they pass, and their own safety.

In their progress, they divide into *Branches*, which become gradually smaller, and which, though taken collectively, are inferior in size to the Trunks from which they issue.

The Branches generally go off at acute angles; but in several places they have a retrograde direction.

They have commonly the same kind of distribution in the opposite sides of the same Body, and vary little in this respect in different Subjects.

In some parts of the Body, several Nerves unite together, and form a *Plexus;* in others, they unite into a *Common Trunk;* and in many, a number of Nerves unite together, and form a hard Knot, termed *Ganglion.*

When the *Plexuses* or the *Common Trunks* are minutely examined by slitting open their Coverings, it is found that their Fibrillæ are intermixed in such a manner, that each of the Nerves passing out from the Plexus, or from the Common Trunk, is composed of Fibrillæ from several, or from all the Nerves which entered it, in consequence of which, the Organs in general are furnished with Nerves from various sources.

The *Ganglia* differ from each other in size and figure: They have thicker Coats, and are more Vascular than the Nerves; and are larger than the whole of the Nerves, taken conjunctly, which enter into or go out from them.—They are supposed to serve as fresh sources of Nervous influence, and this derived from the Vessels dispersed upon them.

They are composed of Nervous Fibrillæ, covered by something like a Cineritious Matter, and are so divided, multiplied, and intermixed, that each of the Nerves passing out from a Ganglion is found to be composed of

Fibrillæ derived from the greater part of the Nerves which enter it.

The Longitudinal Section of a perfectly recent Ganglion, shews the Fibrillæ to have the same serpentine or zigzag appearance as Nerves have in other parts of the Body.

Where Nerves pass out from the side of a Ganglion, they are composed of Fibrillæ which come off in contrary directions; the one set from the beginning, the other from the opposite extremity of the Ganglion.

The Nerves which go out from the different Ganglia have the same structure with those which enter them, but are found, with only a few exceptions, as in some parts of the Sympathetic Nerves, to be rather larger.

In the Trunk of a Nerve, the Cords appear to run parallel to each other; but when macerated in Water, so as to dissolve the Cellular Substance, or when otherwise accurately examined, they are observed to intermix somewhat after the same manner of the Fibrillæ in the Plexus, or in the Ganglia, in consequence of which, the danger arising from Accident or Disease is lessened.

The Termination of the Nerves is soft, pulpy, and pellucid, as is distinctly seen in the Retina of the Eye or Ear; the external covering being entirely laid aside, while the Pia Mater, in particular, accompanies them throughout.

The Nerves preserve the motion of the Muscular Fibres.

They constitute the immediate Organs of Sensation, and convey impressions made upon them to the Mind.

The manner in which these impressions are produced,—whether by a Vibration communicated to the Nerves,—or by a Liquid called *Nervous Fluid*, contained and moving in them,—or by an Electric Matter common to them and many other Substances;—or in what manner that power acts, termed *Animal Electricity*, which has been lately discovered to take place in the Animal kingdom, upon the application of certain Metals,—is not yet understood.

## DISTRIBUTION OF THE NERVES.

THE NERVES are distinguished into two Classes; one arising from, or connected with, the Brain, termed *Cerebral*, the other from, or connected with, the Spinal Marrow, termed *Spinal Nerves*.

According to the idea of some modern Physiologists, the Nerves, instead of taking their origin from the Brain and Spinal Marrow, have their termination there.

The Cerebral Nerves are generally reckoned *Nine* or *Ten Pairs*, besides a particular Pair, which has the name of *Sympathetic*.

They pass through the Holes in the Base of the Cranium, and receive their respective names according to their order; or from their functions; or from the parts on which they are dispersed, &c.

The Spinal Nerves consist of *Twenty-nine* or *Thirty*

*Pairs*, which pass out between the different Vertebræ, besides a Pair called *Accessory*, which enter the Cranium, from the top of the Spinal Marrow, and afterwards pass out with one of the Cerebral Nerves.

## NERVES WHICH PASS THROUGH THE BASE OF THE CRANIUM.

### FIRST PAIR.

The FIRST PAIR, or OLFACTORY NERVES, arise, on each side of the Brain, by three separate Striæ, from the Corpora Striata. The Striæ unite into Trunks at the under and back part of the Anterior Lobes, near where the Carotid Arteries enter the *Fissures of* SYLVIUS.

The Trunks are of a flattened form, are more tender than the other Nerves, and also differ from them in not being composed of Fasciculi.

They run each in a Furrow, upon the under Surface of the Anterior Lobes of the Brain, converging a little, and becoming somewhat larger, till they reach the Cribriform Plate of the Ethmoid Bone.

Upon this Plate, each forms an *Oblong Bulb*, which, in colour and consistence, resembles the Cortical part of the Brain, but is mixed with Streaks of Medullary Matter.

From this Bulb, numerous Nervous Filaments are sent off, which pass through the Holes of the Cribriform Plate, and now become firm and strong like the other Nerves, by receiving a covering from the Dura Mater.

After entering the Nose, they divide into two Portions or Planes, one passing on the Septum, the other upon the Os Spongiosum Superius, and other parts opposite to the Septum, and both running at first in Grooves of the Bones.

They form a beautiful Plexus, which is spread out upon that side of the Membrane of the Nose that is contiguous to the Bones, and may be traced a considerable way upon it, in distinct Threads, which becoming gradually smaller, sink into the Membrane, and are supposed to terminate on the Surface next the Cavity of the Nose, there constituting the Organ of Smell.

## Second Pair.

The Second Pair, or Optic Nerves, which are of great size, arise from the posterior and inferior part of the Thalami Optici; or, according to the opinion of some authors, they have their origin from the Nates and Testes, and are connected in their passage to Tubercles, on the under part of the Thalami, at the root of the Infundibulum, which furnish them with an addition of Medullary Substance.

They are of a purer white than other Nerves, having less Cineritious Matter entering their composition: and differ also in the Pia Mater furnishing them with a general Covering, before it invests the several Fasciculi of which they are formed.

At the fore part of the Sella Turcica they unite, and have their Medullary Parts intimately intermixed.

From this union, they go obliquely outwards and forwards through the Foramina Optica into the Orbits;

and advancing in the Orbits in a waving direction, to prevent them from being overstretched in the motions of the Eye, they perforate the Balls, to be expanded into the Retinæ,—which have been already described.

## THIRD PAIR.

The THIRD PAIR, or MOTORES OCULORUM, smaller than the Optic Nerves, arise at the under, inner, and back part of the Crura Cerebri, or between the Corpora Albicantia and Tuber Annulare, by numerous Threads, which are soon collected into their respective Trunks.

They pass outwards, perforate the Dura Mater at the sides of the Posterior Clinoid Process, and, running along the upper part of the Cavernous Sinuses, at the outside of the Carotid Arteries, they go through the Foramina Lacera into the Orbits.

Upon entering the Orbits, each of them divides into several Branches, which supply the greater number of the Muscles of the Eye, in consequence of which, the Nerves have obtained their particular name.

A Branch runs to each of the Muscles within the Orbit, excepting the Trochlearis and Abductor; and the Nerve likewise assists in forming a small Ganglion, termed *Ophthalmic*, from which Twigs are sent off, to supply the Ball of the Eye.

## FOURTH PAIR.

The FOURTH PAIR, or PATHETIC, have their origin the highest of the Cerebral Nerves, and are the most slender of the Body, being generally formed of one Fasciculus only on each side.

Each of the Nerves of this Pair arises by a single, and sometimes by a double root, behind the Testes, from the Medullary Expansion which lies over the passage to the Fourth Ventricle, and which unites the *Processus ad Testes* to each other.

It afterwards turns round the Crus Cerebri, and some way behind the entrance of the Third Pair, perforates the Dura Mater at the edge of the Tentorium.

It runs afterwards along the Cavernous Sinus, at the outer side of the Third Pair, then crosses over that Pair; and passing out of the Cranium through the Foramen Lacerum, it goes obliquely over the Muscles at the upper part of the Orbit, to be entirely dispersed upon the Obliquus Superior vel Trochlearis.

## FIFTH PAIR.

The FIFTH PAIR, or TRIFACIAL, or PAR TRIGEMINUM, which are the largest Nerves of the Brain, arise, each by an anterior small and a posterior large Portion, from the side of the Tuber Annulare, where the Crura Cerebelli join it.

It enters the Dura Mater a little below the Tentorium, over the point of the Pars Petrosa of the Temporal Bone, and forms a Plexus, in which upwards of fifty Fasciculi have frequently been enumerated.

The Plexus sinks close by the outside of the Cavernous Sinus, concealed by a Doubling of the Dura Mater, and forms a Ganglion, sometimes called GASSERIAN.

The Ganglion is of a Semilunar form, and placed transversely with respect to the Trunk of the Nerve.

From the opposite and curved edge of the Ganglion, three large Branches come out; the first and anterior, termed *Opthalmic*,—the second and middle, the *Superior Maxillary*,—and the third and posterior, the *Inferior Maxillary*.

The FIRST BRANCH of the FIFTH PAIR, at the side of the Sella Turcica, is situated lower than the Third Pair, and afterwards crosses over it, being previously connected by Nervous Matter to the Trunk of the Fourth Pair.

It goes through the Foramen Lacerum into the Orbit, and is there divided into the following Branches, viz.

The *Supra-Orbitar*, which is the largest of the whole, being a continuation of the Ophthalmic.

It passes immediately under the Membrane which lines the upper part of the Orbit, and splits into two Branches of unequal size.

The smaller Branch, termed *Supra-Trochlearis*, runs under the Superciliary Ridge to the Upper Eye-lid and Fore-head.

The larger passes through the Foramen Supra-Orbitarium,—or over the Superciliary Ridge when the Foramen is wanting,—sends Branches to the Upper Eye-lid, and divides into several others, which run back, partly above, but chiefly under the Frontalis, to supply the fore and upper part of the Head in general, while minute Fibres appear to penetrate the Bones:

The *Nasal Branch*, which runs obliquely over the Optic Nerve, where it detaches a Filament or two to the

Eye, then under the Levatores Palpebræ and Oculi; and, getting between the Abductor Oculi and Trochlearis, passes to the inside of the Orbit.

It sends a Branch, which, after entering the Foramen Orbitarium Internum Anterius, re-enters the Cavity of the Cranium, and gets upon the Cribriform Plate of the Ethmoid Bone.

From thence it passes down through one of the anterior Holes of this Plate, and sends Twigs to the Membrane at the anterior part of the Nostril, while the Nerve, descending at the fore part of the Septum Narium, is dispersed upon the Point and Wing of the Nose.

The continuation of the Nasal Branch, now called *Infra-Trochlearis*, passes forwards to the inner corner of the Eye, and is distributed upon the Lacrymal Sac and parts adjacent.

The *Lacrymal Branch*, which runs along the Abductor Oculi, sends Twigs to the Membranes and Fat near it, likewise one or two through the Substance of the Cheek-bone, and one in particular to the Substance of the Lacrymal Gland, while another passes over the Gland, and vanishes in the neighbouring parts:

A *Branch* to the Ophthalmic Ganglion, which is sometimes sent off from the Nasal, at other times from the Ophthalmic Trunk.

The *Ophthalmic Ganglion*, termed also *Lenticular* from its shape, is formed by this Branch from the Fifth, and by another from the Third pair, and is commonly the smallest in the Body.

It is of an oblong form, and compressed; is situated at the outside of the Optic Nerve, a little before the Foramen

ramen Opticum, and is concealed in Fat. Sometimes, though rarely, the Filaments which form it take their origin entirely from the Third Pair.

From the Ganglion, about a dozen of Filaments arise, termed *Ciliary Nerves*, collected into two portions, which creep along the opposite sides of the Optic Nerve, separated a little from each other, and running in company with the Ciliary Arteries.

Besides the Ciliary Nerves from the Ganglion, one, and sometimes two Filaments, arise from the Ramus Nasalis, and pass along with the other Ciliary Branches.

The Ciliary Nerves, running with scarcely any division, reach the back part of the Eye, and, a little before the insertion of the Optic Nerve, enter the Sclerotic Coat, pass obliquely through it, and, about the middle of the Ball, appear upon the Surface of the Tunica Choroides.

Upon this Coat they are flat, and run in a parallel direction, sending very few evident Branches either to it or to each other, till they reach the Ciliary Circle, where they divide into numerous minute Filaments.

Upon the Choroides, five or six Branches are larger than the rest; the others are so minute as almost to escape the Naked Eye.

At the Ciliary Circle, each commonly divides into two Branches, which are covered by the Cellular Substance of the Circle; and these, at the root of the Iris, are subdivided into still smaller Branches, which run in a radiated and waving direction; the Ciliary Vessels being interposed.

Near the Pupil, they are united into Arches, from which very minute Twigs run to the interior margin of the Iris.

The Second Branch, or Superior Maxillary Nerve, is larger than the Ophthalmic, and is principally dispersed upon the parts belonging to the Upper Jaw, from which it has its name.

It goes through the Foramen Rotundum of the Sphenoid Bone, and at its exit divides into numerous Branches, viz.

The *Spheno-Palatine*, or *Lateral Nasal Nerve*, which sends a reflected Branch through the Foramen Pterygoideum of the Sphenoid Bone, to join the Sympathetic Nerve in the Canalis Caroticus, and a Branch which enters the Foramen Innominatum of the Pars Petrosa, to join the Portio Dura of the Seventh Pair.

The Lateral Nasal Nerve goes afterwards into the Spheno-Palatine Hole, to be dispersed upon the under and back part of the Septum, and opposite side of the Nostril, and upon the Membrane of the Sphenoidal Sinus and Eustachian Tube: One Branch, in particular, after passing along the Septum, goes through the Foramen Incisivum to the Roof of the Mouth.

The *Palato-Maxillary*, or *Palatine Branch*, which descends through the Canal leading to the Foramen Palatinum Posterius, and running near the Alveoli with considerable Blood-vessels, sends Branches to the Velum Palati and Roof of the Mouth, and minute Filaments which penetrate into the Palate-plate of the Superior Maxillary Bone:

*Small Branches*, which pass round the Upper Jaw, and vanish in the Cheek.

A *Twig*, which goes through the Hole in the Os Malæ, along with a Branch of the Ocular Artery, to the Face.

*Small Filaments*, which run down into the back part of the Superior Maxillary Bone, and supply the Substance of the Upper Jaw, the Large Dentes Molares, and Membrane lining the Antrum Maxillare.

The Second Part of the Fifth Pair, after sending off these different Branches, goes into the Canal under the Orbit, and forms the *Infra-Orbitar Nerve*, which, while in the Canal, gives off Filaments passing through minute Conduits, in the Upper Jaw, to the Antrum, to the Substance of the Bone, to the small Molares, Caninus, and Incisores; and sometimes a Twig, the companion of a small Branch of the Internal Maxillary Artery, to the Membrane lining the Orbit.

The *Infra-Orbitar Nerve* passes afterwards out of the Foramen Infra-Orbitarium, and divides into many large Branches, to be distributed upon the Cheek, Under Eyelid, Upper Lip, and side of the Nose.

The THIRD BRANCH, or INFERIOR MAXILLARY NERVE, goes through the Foramen Ovale of the Sphenoid Bone, and supplies the parts belonging to the Under Jaw, and the Muscles situated between it and the Os Hyoides, by the following Branches, viz.

One, or sometimes two, *Deep Temporal Branches*, to the inner part of the Temporal Muscle:

*Branches* to the Masseter, Pterygoideus, and Buccinator:

A *Branch*, which passes behind the Cervix of the Lower Jaw, and gives off Filaments to the fore part of the Ear, and afterwards accompanies the Temporal Artery upon the side of the Head, where it terminates:

A *Branch* to the Buccinator, and other parts of the Cheek;

A Nerve of considerable size, termed *Lingual* or *Gustatory*, which passes between the Pterygoidei, to the inner of which it gives off some Filaments. It then sends off from its under side a Ganglion, which transmits Nerves to the Inferior Maxillary Gland.

The *Lingual Nerve* also transmits several Branches to the Sublingual Gland, and to the Muscles of the Tongue.

It terminates at length upon the upper and fore part of the Tongue, but more particularly upon its point, by many Branches which belong chiefly to the Papillæ; in consequence of which, this Branch is considered as the principal Nerve of the Organ of Taste.

The Trunk of the Inferior Maxillary Nerve, having parted with the Lingual Nerve, directs its course between the Pterygoid Muscles to the Posterior Foramen of the Inferior Maxillary Canal.

Before entering the Canal, it sends off a long and slender Branch, which is lodged at first in a Furrow of the Bone, and goes afterwards to be dispersed chiefly upon the Mylo-Hyoideus and Sublingual Gland.

The Trunk of the Nerve is afterwards conducted along the Canal of the Jaw under the Alveoli, where it distributes Filaments to the different Teeth of the corresponding side, and to the Substance of the Bone; and, coming out of the Canal by the Anterior Maxillary Foramen, somewhat diminished in size, it scatters its remaining Branches upon the Chin and Under Lip.

## SIXTH PAIR.

The SIXTH PAIR, or ABDUCENTES, arise from the beginning of the Medulla Oblongata, at the part common to the Tuber Annulare and Corpora Pyramidalia, and are the smallest of the Cerebral Nerves, the Fourth Pair excepted.

They perforate the Dura Mater at the inner side of the entrance of the Fifth Pair, and run forwards within Cells of the Cavernous Sinus, but so surrounded by Cellular Substance, as to seem to be protected from the Blood of that Receptacle.

While in the Sinus Cavernosi, each is situated between the Ophthalmic Nerve and Carotid Artery, upon the Surface of the latter of which it sends off two or three Filaments, to assist in forming the Great Symphathetic Nerve.

The Trunk of the Sixth Pair afterwards goes through the Foramen Lacerum, to be dispersed entirely upon the Abductor Oculi.

## SEVENTH PAIR.

The SEVENTH PAIR is composed on each side of two portions,—the *Portio Mollis*, and the *Portio Dura.*

The PORTIO MOLLIS is the softest of the Nerves excepting the Olfactory.

It arises by transverse Medullary Striæ from the anterior part of the Fourth Ventricle, and is separated from its fellow of the opposite side only by the *Crena* of the Calamus Scriptorius.

The Striæ, turning round the Medulla Oblongata, apply themselves to the Tuber Annulare, from which they receive an addition of Substance, and then get to the side of the Portio Dura.

The PORTIO DURA, sometimes also called *Sympatheticus Minor*, arises from that part of the Brain which is common to the Pons VAROLII, Crura Cerebelli, and Medulla Oblongata; and, at its origin, is situated upon the inner side of the Portio Mollis.

Between the origin of the Portio Dura and Trunk of the Portio Mollis, a small Nerve arises, termed by WRISBERG, *Portio Media inter Portionem Duram et Portionem Mollem.*

It comes off by minute Fibrillæ, which soon unite into a Trunk, from the Posterior part of the Pons VAROLII, or from the adjoining part of the Medulla Oblongata, and is an Accessory Nerve of the Portio Dura.

The Portio Dura, considerably smaller than the Portio Mollis, gets into a *Cul-de-Sac* of the Meatus Auditorius Internus, and is there lodged in a kind of half-sheath, formed by the Portio Mollis, to which it is connected by fine Cellular Substance; the Dura Mater, which lines the Passage, giving here a general Covering to both Nerves.

PORTIO MOLLIS, NERVUS AUDITORIUS, vel NERVUS ACUSTICUS.—The Portio Mollis is formed of two Fasciculi,

ciculi, nearly of equal size, one of which belongs to the Cochlea, the other to the Vestible and Semicircular Canals.

Each of these Fasciculi passes by numberless Fibrillæ through the Cribriform Plate in the bottom of the Meatus Auditorius Internus, to the inner parts of the Labyrinth.

The Fibrillæ destined for the Cochlea go through the Holes in the sides of the Modiolus.

Some pass between the Plates which form the Septa of the Gyri; others go through Holes between the Osseous Plates of the Lamina Spiralis; but by much the greatest number perforate the sides of the Modiolus, between the Septum of the Gyri and the Lamina Spiralis.

The larger Fibrillæ run upon the Membrane covering the Lamina Spiralis: while the smaller go from the Modiolus, between the Osseous Septa, and on the inner sides of the Gyri, to be dispersed upon the Membrane lining them.

The remaining Fibrillæ perforate the Plate common to the Modiolus and Infundibulum, and vanish upon the last half-turn of the Lamina Spiralis, and upon the Cupola of the Cochlea.

Upon the Osseous part of the Lamina Spiralis, th Nerves have the common appearance: but upon the Membranous Portion, they are of the colour of the Retina of the Eye.

In the whole of their course upon the Lamina Spiralis, they form a real Retina; though the reticulated structure becomes much less apparent upon the outer part of this Lamina, and upon the continuation of the Membrane lining the Gyri.—the Nerves seeming to terminate in a semi-pellucid Pulpy Membrane, resembling the Retina of the Eye.

The Membrane upon which the Nerves are expanded is but slightly connected to the Periosteum, which lines the inner side of the Cochlea, and which, though thin, may be readily perceived, being painted with Blood-vessels;—nor does it differ from the Periosteum lining the Tympanum.—See DR MONRO's *Treatise on the Ear.*

The Fasciculus, which belongs to the Vestible and Semicircular Canals, forms at first a Plexus, then a Gangliform Enlargement, previous to its entrance into the Labyrinth.

The Nerves which belong to the Vestible and Semicircular Canals, pass through the Macula Cribrosa, or Holes subdivided into smaller Holes by Cribriform Plates in the bottom of the Meatus Auditorius Internus.

Of these Branches, small Filaments pass through the Macula Cribrosa in the Inferior Fossula of the Meatus Auditorius Internus, to the Alveus Communis, vel Sacculus Vestibuli.

A small Branch goes through another Cribriform Hole in the Inferior Fossula, to the Ampulla of the Posterior Membranaceous Semicircular Canal.

A Branch, larger than any of the former, enters the posterior Holes in the upper Fossula of the Meatus Internus, to be dispersed upon the Ampullæ of the Superior and Exterior Membranaceous Canals.

The Nerves, after reaching the Sacculus Vestibuli and the different Ampullæ, are spread out upon them, as in the Cochlea, in the Form of a net-work; the Fibres of which, by degrees becoming pellucid, disappear upon the beginning of the Membranaceous Canals.

PORTIO DURA, COMMUNICANS FACIEI, vel NERVUS FACIALIS.—The Portio Dura, or Facial Nerve, separates from the Portio Mollis at the Bottom of the Meatus Auditorius Internus, and, by the Anterior Hole in the upper Fossula at the bottom of the Meatus, enters the *Aquæductus* FALLOPII.

After getting into the Canal, it receives the retrograde Nerve from the Second Branch of the Fifth Pair, which enters by the Foramen Innominatum on the fore side of the Pars Petrosa.

It sends Twigs through Foramina in the sides of the Aqueduct, to the Mastoid Cells and to the Stapedius.

A little before its exit from the Aqueduct in the Adult, but at the outer end of it in the Fœtus, it gives off a reflected Branch, termed *Chorda Tympani*, which passes between the long Processes of the Malleus and Incus, and over the Membrana Tympani.

The Chorda Tympani goes afterwards in a Fissure at the outside of the EUSTACHIAN Tube, and soon after it has got out of the Cranium, it joins the Lingual Branch of the Fifth Pair.

In its passage, it supplies the Muscles of the Malleus, and the Membranes, &c. of the Tympanum.

The Portio Dura afterwards passes out of the Aqueduct by the Foramen Stylo-mastoideum, and is at first lodged deep, being situated in a hollow behind the Parotid Gland.

Here it gives a small Occipital Branch, which sends Twigs to the back part of the Ear, and terminates in the Oblique Muscles of the Head.

It sends a Branch to the Digastricus, and another to the Stylo-hyoideus; gives off a Filament which joins the Auricular Branch of the Inferior Maxillary Nerve, and goes to the fore part of the Ear; and is connected by another small Filament at the under part of the Ear, with Branches of the Sympathetic Nerve which run along the External Carotid Artery.

It also furnishes Filaments to the Parotid Gland, and then perforates it; dividing into large Branches, which join, separate, and rejoin, different times, so as to form a Plexus on the side of the Face.

This Plexus is expanded in such a manner as to constitute what has been called by some, *Pes Anserinus*, and is divided into the following Sets of Branches, viz.

The *Temporal Branches*, which ascend upon the side of the Head, to be distributed upon the Temple; some running over, others under the Branches of the Temporal Artery, and forming several joinings with the Frontal Branches of the first part of the Fifth Pair of Nerves:

The *Superior Facial Branches*, which are dispersed upon the Orbicularis Oculi, and the parts in general about the outer Angle of the Eye, communicating in various places above and below the Orbit, with the first and second Branches of the Fifth Pair:

The *Middle Facial Branch*, or the *Great Facial*

*Nerve*, which runs across the Masseter, and divides into many Branches, to be dispersed upon the Cheek, and side of the Nose and Lips:

They are connected with the Branches of the Superior Facial, and near the corner of the Mouth, with others of the second and third parts of the Fifth Pair. They have likewise some communications with deep Branches of these two Nerves, which pass outwards between the Masseter and Buccinator:

The *Inferior Facial Branches*, which proceed along the side of the Under Jaw, to be dispersed upon the parts covering it, and upon the Under Lip; and to connect themselves with some of the Middle Facial Branches, and with others belonging to the third part of the Fifth Pair:

The *Descending*, or *Subcutaneous Cervical Branches*, some of which run forwards under the Lower Jaw, and others downwards, near the External Jugular Vein, to the Superficial Muscles, and to the Integuments at the side and upper part of the Neck, where they form communications with the Inferior Facial Branches, and with different Branches of the Upper Spinal Cervical Nerves.

## EIGHTH PAIR.

The EIGHTH PAIR arise from the Medulla Oblongata, at the sides of the Bases of the Corpora Olivaria, and consist, on each side, of the Nervus Glosso-pharyngeus and Pars Vaga.

The GLOSSO-PHARYNGEUS is the smaller of the two, being only a little larger than one of the Nerves of the Fourth Pair.

The PARS VAGA comes off immediately under the former, and is composed of several separate Fasciculi, which are soon collected into a single Cord.

The two Nerves, passing outwards, go through the Base of the Cranium, immediately before the end of the Lateral Sinus, by the Hole common to the Occipital and Temporal Bones, and are separated from each other, and from the Sinus, by a small Process of the Dura Mater.

The *Glosso-pharyngeus*, termed also *Lingualis Lateralis*, upon its exit from the Cranium, sends a Branch backwards, which joins the Digastric Branch of the Portio Dura.

A little lower, it gives off Branches, which, with others from the Pharyngeal Branch of the Eighth Pair, and from the Great Sympathetic Nerve, form a Plexus which embraces the Internal Carotid Artery, and afterwards sends Branches along the Caroticus Communis to the Heart.

Still lower, it gives Branches which communicate with others belonging to the Pharyngeal Nerve, and go to the upper part of the Pharynx, and to the Stylo-pharyngeus.

The Glosso-pharyngeus, after sending a Twig or two to the Tonsil, to the upper part of the Pharynx, and Membrane of the Epiglottis, divides into many Branches, which run partly to the margin, and partly to the middle of the root of the Tongue, supplying especially the Papillæ Majores, and the parts in their neighbourhood.

The *Pars Vaga*, or *Pneumo-gastric Nerve*, upon emerging from the Cranium, frequently becomes a little increased in diameter for about an inch downwards, forming what some Authors have termed its *Gangliform Enlargement*.

It descends in the Neck at the outer and back part of the common Carotid Artery, to which it is closely united, being included along with it, in the same common Sheath of Cellular Substance.

At the upper part of the Neck, it transmits a Branch, called *Pharyngeus*, to the Pharynx; and immediately afterwards, a larger one, termed *Laryngeus Superior*, to the Larynx; and near the top of the Thorax, it sends a Filament, and sometimes two, to the Heart.

The *Pharyngeus*, chiefly formed by the Pars Vaga, but partly also by a Branch from the Accessorius, is afterwards joined by Branches from the Glosso-pharyngeus, and descends obliquely over the Internal Carotid Artery.

Near the Origin of this Artery, it sends Filaments which join others from the upper part of the Great Sympathetic, and creep along the common Carotid.

Upon the middle of the Pharynx, it expands into a Gangliform Plexus, from which many small Branches are sent out, to be distributed upon the three Constrictors of the corresponding side of the Pharynx; one or two Filaments uniting above with the Glosso-pharyngeus, and others below with the Laryngeus Superior.

The *Laryngeus Superior* descends obliquely forwards between the Carotid Arteries and Pharynx, and, behind the Origin of the Carotids, is divided into a large

Internal or Superior, and a small External or Inferior Branch.

The *Internal Branch* passes forwards between the Os Hyoides and Superior Cornu of the Thyroid Cartilage.

It divides into numerous Branches, some of which go to the Arytenoid Gland, and to the Arytenoideus Obliquus et Transversus, and others to the Glandular Membrane of the Epiglottis; while the greater number and the largest of these Branches are dispersed upon the Glandular Membrane lining the upper portion of the Larynx and parts adjacent.

The *External Branch*,—which Scarpa considers as more properly termed *Pharyngo-laryngeus*,—is originally composed of a Branch from the Internal Laryngeal, and another from the Great Sympathetic; and is connected by a Filament to the Pharyngeal, and sometimes also by one to the Internal Laryngeal Nerve.

It imparts Twigs to the Middle and Lower Constrictors of the Pharynx, and afterwards terminates in the Thyroid Gland and inner part of the Larynx.

The *Filament*, sent from the Pars Vaga at the bottom of the Neck, joins the Great Cardiac Branch of the Sympathetic Nerve in the upper part of the Thorax, to be dispersed upon the Heart.

## Ninth Pair.

The Ninth Pair, frequently termed *Linguales*, and sometimes also *Linguales Medii*,—arise from the under and lateral parts of the Corpora Pyramidalia, on the fore side of the Medulla Oblongata, by numerous Filaments which are collected into Fasciculi.

They pass out at the Superior Condyloid Foramina of the Occipital Bone, after which they adhere, for some way, to the Eighth Pair, by Cellular Substance.

A little below the Cranium, each of the Trunks of this Pair of Nerves is conjoined by a cross Branch with the Sub-occipital Nerve, or with an Arch which connects that Nerve and the First Cervical together.

The Trunk then descends between the Internal Jugular Vein and Internal Carotid Artery, and at the root of the Occipital Artery crosses over both Carotids to its place of destination.

Where it begins to cross over the Carotids, it sends down a Branch of considerable size, termed *Descendens Noni.*

The *Descendens Noni* passes down a certain length along with the common Carotid Artery, and, in its course, furnishes Branches to the upper ends of the Omo-hyoideus and Sterno-thyroideus; after which it unites with Branches from the First and Second, and with small Filaments from the Second and Third Cervical Nerves, forming an Arch, from which long and slender Twigs go to the under Portions of the Sterno-thyroideus, and to the Omo-hyoideus and Sterno-hyoideus.

The Ninth Nerve passes afterwards behind the Facial and Temporal Veins, or the Trunk formed by these, and over the root of the Facial Artery,—sending a Twig to the Hyo-thyroideus.

Upon the Hyo-glossus, the Trunk of the Nerve spreads out into many Branches, which go to the middle of the Tongue, and terminate chiefly in its Fleshy parts;

a Twig extending as far as the Genio-hyoideus, and two, or sometimes only one Filament, anastomosing with the Lingual Branch of the Fifth Pair.

## GREAT SYMPATHETIC NERVE.

The GREAT SYMPATHETIC NERVE,—obtaining its name from its numerous connections with most of the other Nerves of the Body,—is either formed originally by the reflected Branch from the Second of the Fifth Pair, and by one or two, and sometimes three small Filaments, sent down from the Sixth Pair while in the Cavernous Sinus; or, according to the opinion of some Authors, the Sympathetic sends off these small Nerves to join the Fifth and Sixth Pairs.

Upon the Surface of the Internal Carotid, while in the Carotic Canal, the Branches of the Fifth and Sixth Nerves and Great Sympathetic making this connection, are pulpy and tender, and form a Plexus which surrounds the Carotid Artery. From this Plexus the Trunk of the Sympathetic is most frequently considered as being sent out.

After escaping from the Carotic Canal, the Trunk, which is here of small size, is closely connected, for a short space, with the Trunks of the Eighth and Ninth Nerves, and, separating from these, it expands into a large Ganglion, termed *Ganglion Cervicale Superius*, of a long oval form, which is situated opposite to the Second Cervical Vertebra.

From this Ganglion, the Nerve comes out very little increased in size, and descends on the Anterior Vertebral Muscles of the Neck, behind, and to the inner side of, the Pars Vaga of the Eighth Pair of Nerves, with which, and with the Carotid Artery, it is connected by a Sheath of Cellular Substance.

At the under part of the Neck, and nearly where the Inferior Laryngeal Artery turns towards the Larynx, the Sympathetic forms another Ganglion, termed by some Authors *Cervicale Medium*, and by others *Cervicale Inferius*.

The Inferior Cervical Ganglion is somewhat similar in shape and size to the Superior, though it varies considerably in these respects in different Subjects.

From this Ganglion principal Branches are sent down, one of which, larger than the rest, and considered as the continuation of the Trunk, turns outwards between the Inferior Laryngeal and Vertebral Arteries to another Ganglion.

This third Ganglion is placed at the Head of the first Rib, and is termed by some Authors *Ganglion Cervicale Inferius*, vel *Imum*, while others consider it as the first of the Thoracic Ganglia.

The Cervical part of the Great Sympathetic is connected with other Nerves, and dispersed upon different parts, by the following Branches, viz.

One or two short but thick Branches, which connect the beginning of the Superior Ganglion with the root of the Sub-occipital Nerve:

One or two Pulpy Nerves, which run forwards behind the Internal Carotid Artery, and divide into many others. These, together with the Filaments from the Glosso-pharyngeus, form a Plexus which sends

Branches to the Gangliform Expansion of the Pharyngeus, and afterwards embraces the External Carotid Artery, sending Plexuses of Filaments along its different Branches:

One or two other soft Nerves, going behind the Internal Carotid, and with a Branch of the Laryngeus Internus of the Eighth Pair, forming the Laryngeus Internus:

Thick short Roots, connecting the First, or Conjugation of the First and Second Cervicals, with the Superior Ganglion of the Sympathetic Nerve.

From the Superior Ganglion, also, are sent off small Branches, which, uniting with Filaments from the Laryngeus Superior, form the *Ramus Cardiacus Supremus,* vel *Superficialis Cordis.*

The *Superficial Cardiac Nerve* of the Sympathetic, in the right side, divides into Branches at the bottom of the Neck, which send a Filament or two along the Inferior Laryngeal Artery to the Thyroid Gland, and afterwards unite with the Superficial Cardiac Nerve of the Eighth Pair before the Subclavian Artery, and with the Laryngeal Nerve behind it.—In the left side, the Superficial Cardiac terminates in the Cardiac Plexus of Nerves.

From the Second, Third, and Fourth Cervical Nerves, an equal number of Cords descend behind the Scaleni and Rectus Major, to the Middle Ganglion of the Great Sympathetic.

From the opposite side of this Ganglion, Branches are sent down, which join and form the *Nervus Magnus Profundus;* others are fixed to the Superficial Cardiac, and to the Recurrent of the Eighth Pair. The rest go partly over and partly behind the Subclavian Artery, to the Inferior Cervical, and to the first Thoracic Ganglion.

### Nervi Accessorii ad Par Octavum.

The Nervi Accessorii arise by small Filaments from the lateral parts of the Medulla Oblongata and upper portion of the Spinal Marrow.

The Filaments from the Spinal Marrow come off between the Anterior and Posterior Bundles of the Cervical Nerves,—the first of them frequently extending as far as the space between the Sixth and Seventh Pairs.

The different Filaments unite by degrees into their respective Trunks, and often have connections, while within the Dura Mater, with one or two of the Bundles of the uppermost Spinal Nerves.

The Trunk of each Accessory Nerve passes out of the Cranium, in company with the Nerve of the Eighth Pair, but forms no part of that Nerve, being included in its own peculiar Sheath received from the Dura Mater.

After perforating the Cranium, it separates from the Eighth, and descends obliquely outwards through the Sterno-mastoideus to the Shoulder.

At its exit, it sends off a Branch, termed by some *Ramus Minor*, (the Trunk itself being then called *Ramus Major)*, which assists in forming the Pharyngeal Nerve; and gives another, smaller than the former, to be connected to the Pars Vaga of the Eighth Pair.

At the fore part of the Sterno-mastoideus, it is joined by an Arch to the Sub-occipital, and frequently by another to the First Cervical Nerve.

In its passage through the Sterno-mastoideus, it sends several Branches to the Substance of that Muscle, and terminates at length in the Trapezius.

# *SPINAL MARROW,*

# AND

# ORIGIN OF THE SPINAL NERVES.

## SPINAL MARROW.

THE SPINAL, or VERTEBRAL MARROW, is the continuation of the Medulla Oblongata. It begins directly behind the origin of the Ninth Pair of Nerves, and obtains its name from being contained in the Osseous Canal of the Spine.

It is invested by the same Membranes which cover the Brain, and has an additional partial Involucrum from the Ligamentous Membrane which lines the Bodies of the Vertebræ, and which has been already taken notice of in the description of the Ligaments.

On the inner side of the Ligamentous Lining, the Dura Mater is situated, which passes out of the Cranium by the Foramen Magnum Occipitis, and forms a

Cylindrical Sheath, which loosely envelopes the Spinal Marrow, and extends as far as the Os Sacrum.

It is more elastic than the Dura Mater of the Brain, and thereby admits more readily of the different motions of the Spine.

At its egress from the Cranium, it is intimately connected to the beginning of the above-mentioned common Ligamentous Lining, and is also united with the Pericranium at the edge of the Foramen Magnum of the Occipital Bone.

Below the first Vertebra of the Neck, this intimate connection between the Dura Mater and inner Ligament of the Vertebræ is discontinued; a *Cellular*, *Fatty*, and *Slimy Substance*, which surrounds the Dura Mater throughout the rest of the Canal, being interposed between that Membrane and the Ligament.

The Dura Mater is only in contact with the Tunica Arachnoidea, and this also only in contact with the Pia Mater, and lying so loosely over the latter as to be separated from it with facility through the whole length of the Spine.

The Spinal Marrow, like the Brain, consists of a Cortical and Medullary Substance, but differs in this respect, that the Cineritious Matter is placed within the Medullary.

Upon the Surface of the Spinal Marrow, while lying in its natural situation, many transverse Wrinkles or Folds are observed, which allow it to be extended in the motions of the Vertebræ.

It is a little flattened on its anterior and posterior Surfaces, and is larger near the under part of the Neck, and at the top of the Loins, where the great Nerves of the Extremities are sent off, than in the other parts of the Spine.

It is divided into two lateral Portions or Cords, which are separated from each other externally by an anterior and posterior Fissure continued from the Medulla Oblongata; and each of the lateral Portions is in some measure subdivided by a superficial Furrow, into a large anterior and small posterior Cord.

The lateral Portions are firmly united together by fine Cellular Substance, but, without lacerating either, may be separated from each other, before as well as behind, to near their middle, where they are connected by a Layer of Cineritious Matter, which passes from the one Cord into the other.

When the Medulla Spinalis is divided transversely, the Cineritious Substance is observed to have a Cruciform appearance, corresponding with the Cords of which it is composed.

The Body of the Spinal Marrow descends in the Child to the Twelfth Dorsal, and in the Adult as far as the Second Lumbar Vertebra, and terminates there by a Conical point, which is concealed by Fasciculi of Nerves.

## Spinal Nerves.

Each of the lateral Portions of the Spinal Marrow sends off from its anterior and posterior parts, flat Fasciculi of Nervous Filaments, which are placed opposite their fellows on the other side.

Several of the Fasciculi of the Cervical Nerves detach Filaments to those immediately above or below them; and the same thing is occasionally observed of some of the Bundles of Dorsal Nerves.

The anterior and posterior Fasciculi perforate the Dura Mater, from the inner part of which each Fasciculus is furnished with a proper Sheath, which is continued along it, and the Sheaths are connected by Cellular Substance only, till they get between the Vertebræ.

Between the anterior and posterior Fasciculi of Spinal Nerves, and between the Tunica Arachnoidea and Pia Mater, a small Ligamentous Cord, termed *Ligamentum Denticulatum*, is situated, which is attached to the Dura Mater, where that Membrane comes out from the Cranium, and accompanies the Spinal Marrow to its inferior extremity.

It adheres by Cellular Substance to the Pia Mater, and sends off from its opposite sides slender Cords, in the form of *Denticuli*, which carry the Tunica Arachnoidea along with them, and, running more or less in a transverse direction, are fixed each by minute Fibres to the Dura Mater, in the Interstices of the Fasciculi.

The Ligamenta Denticulata of the right and left sides, incorporate with the Pia Mater at the inferior extremity or conical point of the Spinal Marrow, and form a Ligamentous Filament, which perforates the under end of the Dura Mater, and is fixed by small Fibres to the Membranes covering the Os Coccygis, in the manner the Denticuli are fixed to the Dura Mater.

It is termed by some Authors *Ligamentum Piæ Matris*,

*tris*, and was considered by the Ancients as the *Fortieth Pair* of Nerves.

It assists in preventing the Spinal Marrow and the tender origin of the Nerves from being overstretched.

Having got between the Vertebræ, each of the posterior Bundles of the Nervous Fibrillæ forms a Ganglion, from the opposite end of which a Nerve comes out, and is immediately joined by the anterior Bundle, thus constituting the beginnings of the Trunks of the Spinal Nerves.

The Nervous Cords sent out from the Spinal Marrow, after receiving their Coverings from the Dura Mater, become considerably larger than the Fasciculi which form them; as has been already observed in the general description of the Nerves.

As soon as the Spinal Nerves emerge from between the Vertebræ, each sends Branches backwards to the Muscles near the Spine, and others forwards to join the Great Sympathetic Nerve; while the Trunk is continued outwards to its place of destination.

The Spinal Nerves are distinguished on each side by numbers, according to the Bones under which they pass: *Thirty Pairs* are most commonly enumerated;—one going under the Head, and termed *Sub-occipital;*—seven passing under the Cervical,—twelve under the Dorsal,—and five under the Lumbar Vertebræ,—and five under the pieces which originally composed the Os Sacrum.

The Fasciculi which form the Cervical Nerves are short, running nearly in a straight direction from their origin to the Intervertebral Holes. Those which form the Dorsal Nerves are longer than the former, and run more obliquely downwards; and those which form the Lumbar and Sacral Nerves are very long, and run still more obliquely downwards, till at length the undermost of them become nearly longitudinal.

The size of the Fasciculi corresponds with that of the Nerves which they go to form.—The Fasciculi of the four lowest Cervical and first Dorsal are large and broad, giving origin to the Great Nerves which supply the Superior Extremity.—Those of the Back are much more slender, while the Fasciculi of the Loins and the three upper Sacral ones are of great size, to form the very large Nerves which run to the Lower Extremity.

The Lumbar and Sacral Fasciculi, while included in the Dura Mater, form a Bundle of Cords, termed *Cauda Equina*, from the resemblance it has to the tail of a Horse; especially when the Fibrillæ of the Nerves are unravelled by separating them from each other.

The Fasciculi perforate the Dura Mater, nearly opposite to the parts where they pass through the Vertebræ, —of course the Nerves of the inferior parts of the Spinal Marrow emerge from the Spine, considerably lower than their different origins.

## Blood-vessels of the Spinal Marrow.

The Arteries of the Spinal Marrow consist of Anterior and Posterior Spinal Arteries, and of many additional Branches communicating with others from the adjacent Vessels.

The *Anterior Spinal Arteries* arise, one on each side, from the Vertebrals, near where these join to form the Basilar Artery.

Upon the beginning of the Spinal Marrow, they generally unite into a common Trunk, which descends in that depression on the Anterior Surface of the Medulla, whereby it is distinguished into two Lateral Portions, and in this course is covered by the Tunica Arachnoidea. The Artery continues nearly of the same size throughout, in consequence of additions it receives from the neighbouring Arteries.

In the Neck it communicates with the Vertebral, Thyroid, and Cervical Arteries, by Branches which pass through the same Holes with the Nerves.

In the Back it receives Branches from the Intercostal, and in the Loins from the Lumbar Arteries; all of which go through the Intervertebral Holes.

It terminates at the under end of the Spinal Marrow; the Cauda Equina being supplied by Branches from the Internal Iliac Artery, which enter through the anterior and posterior Holes of the Os Sacrum.

The *Posterior Spinal Arteries* arise commonly from the Inferior Arteries of the Cerebellum, and frequently from the Trunks of the Vertebral Arteries within the Cranium.

They are equal in length to the former Artery, but considerably inferior to it in size, and continue separate through the whole of their course.

They have constantly a serpentine appearance, and form frequent Inosculations with each other, and with Arteries, the Branches of which communicate with the Anterior Spinal Artery.

The Arteries of the Spinal Marrow are divided into minute Branches, which are dispersed upon its Substance, upon the Membranes which inclose it, and also upon the Origins of the Nerves and Substance of the Vertebræ.

The *Veins* of the Spinal Marrow accompany their Arteries, and afterwards terminate in the Sinus Venosi of the Spine.

The *Sinus Venosi* consist of one on each side of the Spinal Marrow, which runs exterior to the Dura Mater; being chiefly lodged in the Ligamentous Membrane which lines the fore and lateral parts of the Vertebral Canal.

They extend from the Foramen Magnum of the Occipital Bone to the under end of the Os Sacrum, and are so irregular on their Surface, and so much divided and subdivided within by the openings of Veins, as in many parts to have the appearance of Cells.

At the different Vertebræ, they are joined by cross Branches, which have a semilunar form, like the Surface of the Bones which surround them.

They communicate at their Superior Extremity with the Occipital and Lateral Sinuses, and send numberless Branches outwards, which open into the Veins, the Arteries of which anastomose with those of the Spinal Marrow.

# NERVES

## OF THE

## NECK AND SUPERIOR EXTREMITY.

### Nervus Accessorius.

The Accessory Nerve belongs in some respect to this Class of Nerves; but having part of its origin within the Head, and from its passing out with one of the Cerebral Nerves, it has been already described along with these.

### Sub-Occipital Nerve.

The Sub-Occipital Nerve was formerly calle *Tenth Nerve of the Head*, and by many at present i termed *First of the Neck.*

It arises from the beginning of the Spinal Marrow by an anterior and posterior Fasciculus, like the rest o the Spinal Nerves; and, like these also, it has its Ganglion where it passes out between the Bones.

It perforates the Dura Mater immediately under th entrance of the Vertebral Artery, and goes forwards unde that Vessel, and over the Transverse Process of the Atlas.

It afterwards appears on the fore part of the Neck, and is connected above by an *Arch* to the root of th

Nint

Ninth Nerve, and below by a similar Arch to the first Cervical Nerve.

Anteriorly, it is joined by one or two short Branches to the upper Ganglion of the Great Sympathetic Nerve.

It afterwards divides into Branches, which are distributed upon the Recti et Obliqui Capitis, and upon some of the Deep Extensors of the Head.

## FIRST CERVICAL NERVE.

The FIRST CERVICAL NERVE comes out between the Atlas and Vertebra Dentata, and immediately splits into two parts; the first of which passes forwards under the Transverse Process of the Atlas, and is joined by an Arch with the Nervus Accessorius, and by Branches with the Ninth Pair: It is also connected by a soft Gangliform Pellucid Root, with the upper Ganglion of the Sympathetic Nerve, sending a Branch downwards, to be fixed to the second Cervical Nerve, and also small Branches to the Muscles connected with the fore part of the Vertebræ.

The other, which is the principal part, goes backwards, and, after sending Branches to the Extensors of the Head and Neck, perforates these, and forms the *Proper Occipital Nerve.*

The *Occipital Nerve* ascends upon the Head with the Artery of that name, and terminates upon the Muscles and Integuments upon the upper and back part of the Cranium; some of its Filaments anastomosing with others belonging to the First Branch of the Fifth and Portio Dura of the Seventh Pair.

## Second Cervical Nerve.

The Second Cervical Nerve, after escaping from between the Bones, gives off a Branch which perforates the Muscles connected to the fore and lateral parts of the Vertebræ, and joins the middle Ganglion of the Sympathetic Nerve.

It sends another *Branch* of considerable size downwards to the Trunk of the Third Cervical Nerve.

It sends several Branches to the Sterno-Mastoideus, behind which it is connected by an *Arch*, and still farther out by a Filament, with the Nervus Accessorius.

It is afterwards divided into several Branches; one of which passes downwards some way upon the External Jugular Vein, and, together with a Branch from the First Cervical, forms an Arch with the Descendens of the Ninth Pair.

It gives off a Small Root, which is united with others in the formation of the Diaphragmatic Nerve.

A *Large Branch* comes out from it behind the Sterno-Mastoideus, which, turning over this Muscle, sends off the following Nerves, viz.

The *Inferior Cutaneous Nerve of the Neck*, which passes forwards to the parts under the Lower Jaw:

The *Middle Cutaneous Nerve*, which runs towards the Angle of the Jaw:

The *Great Posterior Auricular Nerve*, which furnishes an anterior Branch to the under part of the Ear, and a posterior Branch, dividing into many others which go to the back part of the Ear and Temple.

The Cutaneous and Auricular Nerves are dispersed upon the Platysma Myoides, Integuments of the side of the Neck and Head, the Parotid Gland, and External Ear; and have several communications with the Portio Dura of the Seventh Pair.

The remainder of the Second Cervical is distributed upon the Levator Scapulæ, and the Extensors of the Neck and Head.

### THIRD CERVICAL NERVE.

The THIRD CERVICAL NERVE, after emerging from between the Vertebræ, sends down a Branch to the Trunk of the Fourth Cervical, and another Branch, which forms the principal root of the Diaphragmatic Nerve.

A *Third Branch* perforates the Muscles on the side of the Vertebræ, and joins the middle Ganglion of the Sympathetic Nerve.

A *Small Filament* connects the Third Cervical with the Descendens of the Ninth Pair.

The Nerve is afterwards divided into *External* and *Internal* Branches.

The External Branches form Anastomoses with the Nervus Accessorius, near the upper part of the Scapula; while the Internal, after furnishing Twigs to the Jugular Glands, are dispersed by several large Branches upon the Muscles and Integuments at the under part of the Neck, and upper part of the Shoulder.

### FOURTH CERVICAL NERVE.

The FOURTH CERVICAL sends a Branch behind the Muscles situated on the fore and lateral parts of the Cervical Vertebræ, to the middle Ganglion of the Sympathetic Nerve.

It is connected by one, and sometimes by two Filaments, to the Diaphragmatic Nerve.

It gives Twigs to the Jugular Glands and Deep Muscles of the Neck, and, at the outer edge of the anterior Scalenus, joins the Fifth Cervical Nerve.

### FIFTH, SIXTH, AND SEVENTH CERVICALS, WITH THE FIRST DORSAL NERVE.

The FIFTH CERVICAL is united with the Fourth into a common Trunk, which, after running a little farther out, joins the Sixth Cervical Nerve.

The SIXTH CERVICAL joins the Seventh behind the Clavicle; and to the Seventh, the First Dorsal Nerve is added over the First Rib.

The Four Inferior Cervicals and First Dorsal Nerve are of great size,—especially the Fifth, Sixth, and Seventh Cervicals.

They pass out between the Scalenus Anticus and Medius, and afterwards run between the Subclavius and First Rib, at the outer side of the Subclavian Artery, to the Axilla.

### AXILLARY, OR BRACHIAL PLEXUS.

In the Axilla, the Nerves mentioned above, separate, unite, and separate again, forming an irregular Plexus, termed *Axillary* or *Brachial*, which surrounds the Axillary Artery.

In the Axillary Plexus, the Nervous Fibrillæ are so intermixed, that each of the Trunks passing out from it, may be considered as being formed of Fibres from most of the Nerves which enter into its composition.

The *Axillary Plexus* sends Branches to the Subscapularis, Teres Major, and Latissimus Dorsi, and furnishes the *External Thoracic Nerves* which accompany the Blood-vessels of that name to the Pectorales, Mamma, and Integuments.

The Plexus afterwards divides into Nerves, most of which are remarkably large, to supply the Superior Extremity.—They are as follow:

### NERVUS SCAPULARIS.

The SCAPULARIS, which commonly arises from the combination of the Fourth and Fifth Cervicals, and, extending outwards, runs through the Semilunar Arch in the upper edge of the Scapula, afterwards descending between the Root of the Spine and Head of that Bone.

It furnishes *Branches* to the Supra-Spinatus, and is ultimately spent upon the Infra-Spinatus.

### NERVUS ARTICULARIS.

The ARTICULARIS arises, like the former Nerve, from the Trunk common to the Fourth and Fifth Cervicals.

It sinks deep in the Axilla, and, getting between the under edge of the Subscapularis, and insertions of the Teres Major and Latissimus Dorsi, it follows the course of the Posterior Circumflex Artery, round the Body of the Os Humeri, immediately below the Articulation.

It sends *Branches* to the Teres Minor, and some *Twigs* to the Ligament of the Joint; but is chiefly dispersed upon the Deltoides.

### Nervus Cutaneus.

The Nervus Cutaneus arises from the Trunk common to the last Cervical and first Dorsal Nerve; but is principally formed by Fibrillæ from the latter.

It runs down at the inner and fore part of the Arm, near the Radial Nerve.

It sometimes gives a *small Branch* to the upper part of the Coraco-Brachialis and Biceps; and farther down, it gives others to the Integuments and Coats of the Blood-vessels.

About the middle of the Arm, it splits into two Branches,—an Internal and External.

The *Internal Branch*, which is rather the smaller of the two, passes before the Basilic Vein, to the inner part of the Elbow, where it divides into Branches; two of which, larger than the rest, turn obliquely over the Heads of the Flexors of the Hand, to be dispersed upon the inner and back part of the Fore-Arm.

The *External Branch* divides into several others, behind the Median Basilic Vein, which descend on the Anterior and Ulnar side of the Fore-Arm, as far as the Wrist.

They pass partly over and partly under the Subcutaneous Vessels; furnishing Twigs to these, and vanishing in the Integuments.

### NERVUS CUTANEUS INTERNUS MINOR OF WRISBERG.

Besides the Nervus Cutaneus, there is another, termed *Cutaneus Minor Internus* of WRISBERG, which, like the rest of the Nerves of the Superior Extremity, takes its origin from the Axillary Plexus; but is more particularly connected with the Ulnar Nerve. It is considerably smaller than the Nervus Cutaneus.

It soon separates from the Ulnar, running afterwards between it and the inner side of the Arm.

A little below the Axilla, it splits into two Branches:

The smaller, turning to the posterior part of the Arm, is divided into Filaments, which are chiefly dispersed upon the Triceps and its Integuments:

The larger Branch descends at the inner edge of the Triceps, and vanishes upon the under end of that Muscle, and upon the Skin of the Elbow.

### NERVUS MUSCULO-CUTANEUS.

The MUSCULO-CUTANEUS, called also *Perforans* CASERII, consists of Fibrillæ from almost all the Nerves entering the Plexus.

The Cord formed by these Fibrillæ perforates obliquely the upper part of the Coraco-Brachialis, to which it gives Branches.

It afterwards passes between the Biceps and Brachialis Internus, furnishing Branches to both.

At the Elbow, it gets to the outside of the Tendon of the Biceps, and runs behind the Median Cephalic Vein.

From thence it descends in the Fore-Arm, between the Supinator Longus and Integuments; furnishing Branches to the latter, as far as the root of the Thumb and back part of the Hand.

## NERVUS SPIRALIS.

THE SPIRAL, or SPIRAL-MUSCULAR NERVE, is apparently formed by all the Nerves entering into the Axillary Plexus, and, when the Sheaths of the Nerves are slit open, is found to be composed of Fibrillæ from each of the Trunks, excepting from that of the first Dorsal.

It is rather larger than any other Nerve of the Superior Extremity, and is distinguished by its Spiral direction.

It is at first situated between the Axillary Artery and the Ulnar Nerve, and passes obliquely downwards between two of the Heads of the Triceps Extensor Cubiti, and afterwards behind the Os Humeri, to the outside of the Elbow.

From thence it proceeds among the Muscles of the Radial side of the Fore-Arm, as far as the Hand.

While passing behind the Os Humeri, it gives several Branches of considerable size to the different Heads of the Triceps; some of them accompanying the Branches of the Arteria Spiralis, and terminating on the Heads of the Extensors of the Hand.

Immediately behind the Body of the Os Humeri, it transmits a *Subcutaneous Branch*, which is distributed upon the Muscles and Integuments on the posterior part of the Fore-Arm, anastomosing at last with the Nerves on the back part of the Hand.

The Trunk of the Nerve, having arrived at the Elbow, is lodged in a Fissure between the Brachialis Internus and Radial Extensors of the Carpus, and there gives off other Branches to the Extensors and the Supinators of the Hand.

At the Head of the Radius, the Trunk of the Nerve divides into two nearly equal-sized Branches,—the *Superficialis* and *Profundus.*

The *Superficialis,* continued almost straight from the Trunk, transmits first a Branch to the Extensores Radiales and Supinator Longus, and then descends at the inner edge of this Muscle along with the Radial Artery.

A little below the Middle of the Radius, it crosses between the Tendons of the Supinator and Extensores Radiales, and is divided into a Volar and Dorsal Branch.

The *Volar Branch,* after sending Twigs to the Annular Ligament, is distributed to the Muscles and Teguments of the Thumb.

The *Dorsal Branch* is again subdivided into numerous other Branches, some of which go to the Muscles in the interval of the Metacarpal Bones of the Thumb and Fore Finger, a few Filaments being distributed to the Annular Ligament; while principal Branches run, one along each side of the Fore and Mid Finger, and likewise along the Radial side of the Ring Finger.

The *Ramus Profundus*, after sending several Branches to the Extensores Radiales and Supinator Brevis, perforates the latter, and gets to the back part of the Fore-Arm.

After quitting the Supinator, it descends under the Extensor Primi Internodii Pollicis and Extensor Digitorum to the back of the Hand.

In this course, it sends Branches to the different Extensors of the Thumb and Fingers, and at length degenerates into a slender Branch, which, at the Wrist, adheres closely to the Annular Ligament. It has here a Gangliform appearance, and is dispersed, partly upon this Ligament, and partly on the Membranes and Muscles on the back part of the Metacarpus.

### NERVUS RADIALIS.

The RADIAL or MEDIAN NERVE comes from the middle and lower part of the Plexus. It is formed by Fasciculi from all the Nerves which enter the Plexus, and is nearly of a similar size with the Spiral Nerve.

It descends in the Arm, along the anterior Surface of the Humeral Artery, to which, and to the Deep Veins, it adheres closely by Cellular Substance.

In this course, it does not give off any considerable Branches:—Twigs, however, are sent from it to the Coats of the Adjacent Vessels.

At the bending of the Elbow, it slips over the Tendon of the Brachialis Internus, and perforates the back part of the Pronator Teres.

It afterwards descends between the Flexor Radialis and Musculus Sublimis, and goes in the middle of the interval of the Radial and Ulnar Artery in its way to Hand.

When it approaches the Fore-Arm, it transmits Branches to the Pronator Teres and Integuments near that Muscle.

In the Flexure of the Arm, it furnishes Branches to the Pronator, Flexor Radialis, and Flexor Sublimis, and an Interosseous Branch, which, in some Subjects, receives an addition from the Spiral Nerve.

The *Interosseous Nerve* gives Branches to the Flexor Longus Pollicis, and to the Flexor Profundus Digitorum, descends upon the Interosseous Ligament with the Vessels of that name, and terminates in the Pronator Quadratus.

Near the Hand, it sends a Branch, dividing into others which supply the Muscles and Integuments forming the Ball of the Thumb.

The Trunk of the Nerve, having given Branches to the Fore-arm, passes under the Annular Ligament of the Wrist, where it divides into Branches which are situated behind the Aponeurosis Palmaris and Superficial Arch of the Arteries.

The principal Branches in the Palm come off in three divisions, from which seven Nerves of considerable size are distributed to the Thumb and Fingers. Of these, two go to the Thumb, and one to the Radial side of the Fore Finger: the rest come off from two forked Trunks, near the Heads of the Metacarpal Bones, and supply the adjacent sides of the Fore and Middle, and of the Middle and Ring Fingers.

These Branches send Twigs through the Aponeurosis to the Integuments of the Palm, and others to the Musculi Lumbricales; after which they accompany the Arteries sent out from the Superficial Palmar Arch, bestowing Twigs to the corresponding parts of the Fingers, at the points of which they terminate, by numerous Fibres.

## NERVUS ULNARIS.

The ULNAR NERVE, like the former, is of great size, and comes off chiefly from the last Cervical and first Dorsal Nerve.

It extends along the inside of the Triceps, frequently perforating some of its Fleshy Fibres, and, near the Elbow, slants a little backwards, to get into a Groove between the Inner Condyle of the Os Humeri and Olecranon of the Ulna.

From thence it passes to the Fore-arm, where, after perforating the Heads of the Flexor Muscles, it joins the Ulnar Artery a little below its origin, and accompanies that Vessel,—running behind it all the way to the Hand.

Under the Axilla, it sometimes receives a Branch from the Spiral Nerve; and from this connection, or from the Trunk of the Ulnar Nerve itself, a Subcutaneous Branch is sent off, which runs between the Triceps and Integuments; furnishing Branches to the latter for a considerable way along the Fore-arm.

Near the under end of the Os Humeri, a Twig or two commonly go to the inner end of the Triceps.

Under the bending of the Elbow, a Branch is given out to be dispersed upon the Belly of the Flexor Ulnaris.

Immediately below the former, another Branch is produced, which is distributed upon the Flexor Profundus Digitorum.

About the middle of the Fore-arm, a Filament is transmitted, which adheres to the Ulnar Artery, furnishing small Twigs to the Sheath and Coats of the Artery, and terminating in the corresponding parts of the Wrist, and Integuments of the Palm.

Near the end of the Ulna, a considerable Branch, termed *Dorsalis,* is sent out, which, turning between the Flexor Ulnaris and Ulna, is directed to the back part of the Hand.

The *Dorsal Nerve* sends Branches to the Integuments of the Wrist and Metacarpus, which have various Anastomoses with others of the Spiral Nerve.

It sends off a Branch, which proceeds along the Ulnar side of the Little Finger; and at the Heads of the Metacarpal Bones, another, splitting into two Branches, which run along the adjacent sides of the Auricular and Ring Fingers.

The Trunk of the Nerve passes with the corresponding Artery over the Annular Ligament into the Palm, where, like the Radial Nerve, it is covered with the Aponeurosis Palmaris.

In the Palm, it divides into Superficial and Deep Branches: the former destined chiefly for the Fingers, the latter for the Deep Region of the Hand.

The *Superficial Palmar Nerve* sends—

Branches to the short Muscles of the Little Finger:

A Branch to the Volar-Ulnar side of the Little Finger:—and

Another, which is soon split into two smaller Branches; one to the Radial side of the Little Finger, the other to the Ulnar side of the Ring Finger.

The *Deep Palmar Nerve* sinks in between the Abductor and Flexor Parvus Minimi Digiti, or perforates the Head of the latter, and forms an Arch, which accompanies the Deep Arch of the Arteries, under the Tendons of the Flexors and the Lumbricales.

The Deep Nerve gives—

A Branch to the Abductor Minimi Digiti, and one to each of the Interossei:

A Twig to each of the Lumbricales, which enters from behind:

Branches to the Flexor Brevis and Adductor Pollicis.

The Nerve terminates at length by several short Branches upon the Adductor Indicis.

The Nerves on the Palm and corresponding part of the Fingers, like the Arteries, are much larger than those of the opposite side of the Hand.

The Palmar Digital Nerves send off many lateral Branches to the Integuments and other parts of the Fingers, and terminate, each, by a Brush of Fibres, at the Apices of the Fingers.

Between the Branches of the Radial and Ulnar Nerves, different Anastomoses are frequently found; and the same may be observed between the Nerves of the Palmar and Dorsal sides of the Fingers.

### Nervi Intercosto-Humerales.

Besides the Nerves of the Superior Extremity sent from the Brachial Plexus, there are others belonging to it, which take their origin from the Intercostal Nerves, and which may therefore be termed *Intercosto-Humerales.*

The *Intercosto-Humeral Nerves* consist of a Branch from the Second, and of another from the Third Intercostal Nerves; both of which pass out at the fore and lateral parts of the Thorax, the one under the Second, and the other under the Third Rib.

The First Nerve is joined by a small Branch with the Cutaneous Nerve, or with the *Cutaneus Internus* of Wrisberg, and is afterwards dispersed by numerous Filaments upon the Axillary Glands, and upon the Integuments of the Axilla and of the inner part of the Arm.

The Second Nerve is connected by one or more Branches with the First, and sends some Twigs to the

Axillary Glands; but is chiefly distributed upon the Integuments of the back part of the Arm, which it supplies with many Branches,—some of them extending as far as the Elbow.

# *NERVES*

# WITHIN

# THE THORAX.

THE NERVES, in each side of the Thorax, consist of the *Phrenic*, the *Pars Vaga* of the Eighth Pair, the *Great Sympathetic*, and the *Intercostals;* all of which are concealed by the Pleura, till they are exposed by Dissection.

## NERVUS PHRENICUS.

The PHRENIC, or DIAPHRAGMATIC NERVE, has a small Filament from the second Cervical; but is chiefly formed by a Branch from the Third, and by one, and sometimes by two, from the Fourth Cervical Nerve.

It descends in the Neck, along the outer and fore part of the Scalenus Anticus, and enters the Thorax behind the anterior extremity of the First Rib, between the Subclavian Artery and corresponding Vein.

In the Thorax, it passes first over the root of the Lungs, and then proceeds along the Pericardium, to which it adheres closely in its way to the Diaphragm.

The Right Phrenic has nearly a straight direction opposite to the Superior Cava and Right Auricle; while the Left makes a considerable Curve near its under end, corresponding with that part of the Pericardium which covers the Point of the Heart.

Upon the Surface of the Diaphragm, the Trunk is divided into several Branches, which are distributed in a radiated manner upon the Fleshy sides of that Muscle.

## PARS VAGA.

The Pars Vaga, upon approaching the Thorax, sends a Filament, and sometimes two, termed *Cardiac Nerves*, which join the Cardiac Branch of the Great Sympathetic, as already observed.

It enters the Thorax between the Subclavian Vein and Artery, and, after giving off the *Recurrent Nerve*, passes behind the root of the Lungs.

## NERVUS RECURRENS.

The Recurrent Nerve is reflected upwards, behind the Subclavian Artery in the right, and behind the Arch of the Aorta in the left side of the Thorax;—in consequence of which, the left Nerve is the longer of the two. It afterwards ascends in the Neck, adhering to the posterior and lateral parts of the Trachea in its way to the Larynx.

It is connected, near its Origin, by one or two Branches of considerable size, with the adjacent Ganglia of the Great Sympathetic Nerve; and from the opposite side of its root it sends other considerable Branches to join other Nerves of the Eighth Pair, in the formation of the Pulmonary Plexus of Nerves.

Near the Subclavian Artery, it is connected by different Filaments to the Superficial and Deep Cardiac Branches of the Sympathetic Nerve.

In its ascent in the Neck, it transmits *Pencils of Filaments*, which penetrate the Trachea, and are dispersed upon its Internal Membrane.

Behind the Thyroid Gland, it sends off minute Fibres to the beginning of the Esophagus and bottom of the Pharynx, and small Twigs to the Gland itself.

Upon the inner side of the Thyroid Cartilage, it furnishes a Branch which constitutes a remarkable Anastomosis with another from the Internal Laryngeal Nerve.

At the back part of the Larynx, it is divided into many Fibrillæ, which are distributed to the different Muscles fixed to the Arytenoid Cartilage of the corresponding side.

It has also some connections, smaller than the one already mentioned, with Branches of the Internal Laryngeal Nerve, and sends minute Fibrillæ to the Internal Membrane of the Larynx; from which circumstance, the Recurrent Nerves are considered as the principal Instruments of the Organ of Voice.

## PULMONARY AND ESOPHAGEAL BRANCHES OF THE PARS VAGA.

The Pars Vaga, having transmitted the Recurrent Nerve, gives off Filaments, which form connections with Branches arising from the Root of the Recurrent of the same and of the opposite side.

They Anastomose also by small Fibrillæ with the Cardiac Branch of the Sympathetic, and then pass to the fore part of the Bronchi, where they constitute what is termed the *Anterior Pulmonary Plexus* of Nerves.

The *Anterior Pulmonary Plexus,* thus formed by Branches from the Trunk of the Eighth Pair, with the assistance of others from the Recurrent and Sympathetic Nerves, extends across the Great Branches of the Pulmonary Artery, and, after transmitting small Filaments to the Pericardium and to the Great Cardiac Nerve, furnishes many minute Fibrillæ, which accompany the Ramifications of the Bronchi and Pulmonary Bloodvessels in the Substance of the Lungs.

From the Pars Vaga, a little below the Origin of the Recurrent, and likewise from the Root of the Recurrent itself, Nerves are sent off, which form a Plexus, that is dispersed, partly upon the Fleshy Glandular Substance of the Trachea, and partly upon the Esophagus, which it embraces, forming upon it the *small Esophageal Plexus.*

Behind the Root of the Lungs, about six or seven Nerves of different sizes are sent off in a transverse direction, which are termed *Posterior Pulmonary Plexus,* although they have few connections with each other.

The Posterior Pulmonary Nerves, like the Anterior, follow the Branches of the Bronchi and Blood-vessels in the Substance of the Lungs, and, becoming gradually smaller, send off minute Twigs, which penetrate the Air-vessels, and are ultimately dispersed upon their Internal Membrane.

After giving out the Pulmonary Nerves, the Pars Vaga is split into Cords, termed *Great Esophageal Plexus*, which surrounds the Esophagus, sends Filaments into its Substance, and is joined by Funiculi of the Pars Vaga of the opposite side.—It goes afterwards through the Diaphragm, to be distributed upon the Viscera of the Abdomen.

### NERVUS SYMPATHETICUS, AND CARDIAC NERVES.

From the Ganglia of the Great Sympathetic Nerve, at the bottom of the Neck, and top of the Thorax, the principal *Cardiac Nerves* are produced, which are dispersed upon the Heart, while the continuation of the Trunk of the Sympathetic descends in the Thorax at the side of the Vertebræ.

The CARDIAC NERVES of the RIGHT SIDE consist of the *Cardiacus Magnus Profundus*, and *Cardiacus Minor*: the latter of which is termed by SCARPA, *Cardiacus Aortæ Superficialis.*

The CARDIACUS MAGNUS PROFUNDUS is principally formed by Branches from the Second Cervical Ganglion of the Sympathetic, and afterwards receives one or two Filaments from the Cardiacus Supremus, together with the Superficial Cardiac and other Branches of the Eighth Pair, as formerly described.

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The Trunk, arising in this manner from different sources, passes between the Superior Cava and ascending Aorta, to the posterior Surface of the latter, and joins the Cardiac Branches of the Left side.

By the addition of the Left Cardiac Nerves, a Plexus is formed, termed *Plexus Cardiacus Magnus of* HALLER, from which is sent out a long Ganglion of a soft consistence, described by WRISBERG under the name of *Ganglion Cardiacum.*

From the Cardiac Ganglion, the following Branches are given off, viz.

A Branch which, after transmitting Filaments to the Anterior Pulmonary Plexus of the Eighth Pair, passes behind the Right Division of the Pulmonary Artery to the Left Coronary Plexus of the Heart:

One or two Filaments, which unite with others sent from the Anterior Pulmonary Plexus of the Eighth Pair, and go before the Right Branch of the Pulmonary Artery to the Base of the Heart;

Branches of considerable size, passing partly over the right side of the Aorta, and partly between it and the Pulmonary Artery, to the Anterior Coronary Plexus:

Small Branches which unite with others coming from the Trunk of the Great Cardiac Nerve, and pass over the Aorta to the Anterior Coronary Plexus.

The NERVUS CARDIACUS MINOR arises from the undermost Cervical Ganglion, creeps over the Arteria Innominata and Aorta, and terminates in a Plexus formed by the Cardiac Nerves on the left side of the Aorta Ascendens.

The LEFT CARDIAC NERVES are, the *Cardiacus Superficialis*, and the *Cardiacus Magnus Profundus.*

The CARDIACUS SUPERFICIALIS arises from the upper part of the Sympathetic Nerve, as formerly noticed, and passes behind the Arch of the Aorta to the Plexus Cardiacus Magnus.

The CARDIACUS MAGNUS PROFUNDUS SINISTER, the upper portion of which is smaller than that of the right side, arises by numerous roots from the middle, and also from the lowest Ganglion of the Sympathetic Nerve.

It passes across the Arch of the Aorta, and, after receiving the Cardiac Branch of the Eighth Pair, joins the Great Cardiac of the right side, to assist in forming the Cardiac Plexus.

From the Cardiac Plexus, a *Reticulum* of Nerves extends upon the left side of the Ascending Aorta, which receives the Cardiacus Minor, and a Filament or two from the Cardiacus Magnus of the right side, going over the Aorta.

From this Reticulum, the *Anterior* or *Right Coronary Plexus* is produced, which passes between the Pulmonary Artery and Aorta, and afterwards follows the course of the Trunk and Branches of the Right Coronary Artery, along with which it is dispersed upon the corresponding side of the Heart.

The Great Cardiac Plexus, after sending a Filament or two to the Lungs, gives off Nerves which unite and form the *Trunk* of the Great Deep Cardiac Nerve of the left side, which has a soft Gangliform appearance, and passes along the corresponding side of the Pulmonary Artery.

Upon the Surface of this Artery, the Trunk soon divides into Branches, which, after sending Filaments across it to the Right Coronary Plexus, give origin to the *Coronary Plexus* of the *left side*, which attends the Trunk and Branches of the Left Coronary Artery.

In the Left or Posterior Coronary Plexus, the Nerves are larger than in the Right, corresponding with the parts they have to supply; and the Plexuses have repeated connections with each other on the Surface of the Heart.

In general, the Nerves run close to the Arteries; some of them being continued as far as the Apex, while others penetrate the Substance of the Heart.

## SYMPATHETIC NERVE CONTINUED.

The Great Sympathetic, having produced the principal Cardiac Nerves, consists of an anterior and posterior part,—the former going over, and the latter under the Subclavian Artery.

Behind this Artery, the two parts unite into a Trunk, which descends in the Thorax over the Heads of the Ribs.

At the Head of each Rib, it forms a small flat Ganglion of an irregular shape, which unites behind with each of the Intercostal Nerves, generally by two, and sometimes by three short Branches.

From several of the Dorsal Ganglia of this Nerve, Filaments are detached obliquely over the Vertebræ to the Coats of the Aorta.

## NERVUS SPLANCHNICUS.

From the Sixth, Seventh, and Eighth Dorsal Ganglia,—and frequently from a Ganglion above or below these,—Branches arise, which descend obliquely upon the sides of the Vertebræ, and unite into a Trunk, termed *Nervus Splanchnicus*, which perforates the Appendix of the Diaphragm, and goes to the Viscera of the Abdomen; from which circumstance the Nerve obtains its name.

Besides the Nervus Splanchnicus, another, termed *Splanchnicus Secundarius*, vel *Accessorius*, is generally observed, arising from one or two of the Dorsal Ganglia, below the Origin of the Splanchnicus, which it joins near its termination,—or runs separate from it into the Abdomen.

## NERVI INTERCOSTALES.

The INTERCOSTAL, or COSTAL, or DORSAL NERVES, after escaping from the Vertebræ, run in the Furrows at the lower edges of the Ribs, in company with the Intercostal Blood-vessels, and proceed to the anterior part of the Thorax, between the two Layers of the Intercostal Muscles.

Immediately after getting out from between the Vertebræ, each is connected, as already taken notice of, by short Branches to the Sympathetic Nerve.

Opposite to this connection, they give principal Branches backwards to the Muscles lying near the

Spine, and serving for the erection of the Trunk of the Body.

Through the rest of their course, they send off Branches to the Intercostales, to the other Muscles, and to the Integuments of the Thorax, and also to those of the Abdomen, and, becoming gradually smaller, they at last vanish in the fore part of the Body.

The six upper Intercostals send Branches to the numerous Muscles, and to the Integuments covering the back part of the Thorax, to the Serratus Magnus, and to the upper part of the Abdominal Muscles; while the remains of them, passing out between the Ribs at the edge of the Sternum, are reflected along with Branches of the Internal Mammary Blood-vessels, to be dispersed by small Filaments upon the Mamma, and likewise upon the Muscles and Integuments next the edge of the Sternum.

The Trunk of the First Intercostal enters into the composition of the Axillary Plexus; a Branch of it, however, runs along the edge of the First Rib, in the manner the other Intercostals run along their respective Ribs.

Two Principal Branches, one from the Second, and the other from the Third Intercostal, are occupied in forming the Intercosto-Humeral Nerves, already described; while a considerable Branch from the Fourth is reflected over the edge of the Latissimus Dorsi to the Integuments of the back part of the Thorax.

The Six Lower Intercostals, after supplying the adjacent Muscles and Integuments of the Thorax, continue their course obliquely forwards, and are dispersed upon the different Muscles and Integuments of the Abdomen.—The Twelfth, running from the last Rib along the under end of the Abdomen, sends Filaments, which extend as far as the Skin of the Pelvis and Thigh.

## *NERVES*

### OF THE

## CHYLOPOIETIC AND ASSISTANT CHYLOPOIETIC VISCERA.

THE NERVES of the Chylopoietic and Assistant Chylopoietic Viscera are formed by *Branches* of the *Par Vagum*, and by the *Rami Splanchnici* of the *Great Sympathetic Pair*; all of which, like the Blood-vessels, are covered by the Peritoneum, in their course towards the Viscera.

### PAR VAGUM.

The PARS VAGA of the *Left Side*, descending from the Great Esophageal Plexus of the Eighth Pair, creeps along the fore part of the Cardia, detaches Filaments to the Left Hepatic Plexus, and divides into many Branches, which are distributed to the Upper and Left Portion of the Stomach.

The RIGHT PARS VAGA passes upon the posterior part of the Cardia, and splits into two Fasciculi; one of which goes to the root of the Hepatic Plexus, and to the Cœliac Ganglion, while the other, which is the principal one, is dispersed by numerous Branches upon the under and Left Portion of the Stomach.

The Nerves of the two Fasciculi have several connections with each other, about the Cardia, and along the small Curvature of the Stomach, and form a Plexus, by some Authors termed *Coronary*, from which Branches extend along the small Curvature, as far as the Pylorus.

## RAMI SPLANCHNICI.

The RAMUS SPLANCHNICUS, and SPLANCHNICUS SECUNDARIUS, have their origins from the Sympathetic, and perforate the upper and lateral part of the inferior Muscle of the Diaphragm,—as already mentioned in the description of the Nerves of the Thorax.

After entering the Abdomen, they expand their Fibres, and incorporate with the lateral part of the Great Semilunar Ganglion.

## SEMILUNAR GANGLION.

The SEMILUNAR GANGLION is formed by the Rami Splanchnici of the Right and Left Sympathetics, with the addition of the Branches of the Eighth Pair.

It is of a long curved shape, with the convex edge undermost, and is composed of many smaller Ganglia, termed *Cœliac*, which are of different sizes, and of irregular forms.

The CŒLIAC GANGLIA are placed over the Aorta, about the roots of the Cœliac and Superior Mesenteric Arteries, and extend some way upon the Fleshy Pillars of the Diaphragm.

From the Cœliac Ganglia innumerable Nerves issue out on all sides, forming a Plexus, termed by some Authors, *Solar*, which extends along the Trunks and Branches of the Cœliac and Superior Mesenteric Arteries.

The Nerves upon these Arteries are so intermixed with each other, and with Cellular Substance, as to form confused Webs; the name of *Plexus*, however, is still retained, and the particular name of each Plexus is derived from the Artery which it surrounds, or the Viscus to which it belongs.

### HEPATIC PLEXUS.

The HEPATIC PLEXUS, after giving Twigs to the Renal Glands, sends Filaments to the Diaphragm, which accompany the Diaphragmatic Arteries, and anastomose with Branches of the Phrenic Nerves.

It afterwards divides into Right and Left Plexuses, corresponding with the Right and Left Branches of the Hepatic Artery, or with the Right and Left Trunks, when such are present.

The Left Hepatic Plexus furnishes several Branches to the Stomach, which intermix with those of the Eighth Pair, upon the small Curvature.

The Right Hepatic Plexus imparts Branches to the corresponding parts of the Pancreas, to the small end of the Stomach, and beginning of the Duodenum, and gives origin to the Right Gastro-Epiploic Plexus, which attends the Artery of the same name, distributing its Filaments to the Great Curvature of the Stomach, and to the Omentum Majus.

The Hepatic Plexuses surround the Hepatic Artery and Vena Portæ, and, after sending several Filaments to the Biliary Ducts and Gall-Bladder, follow the Branches of the Blood-vessels through the Substance of the Liver.

### SPLENIC PLEXUS.

The SPLENIC PLEXUS, composed of several small Filaments, surrounds the Splenic Artery, gives Twigs to the Pancreas, and then accompanies the Vessels into the Spleen.

### SUPERIOR MESENTERIC PLEXUS.

The SUPERIOR MESENTERIC PLEXUS forms a Vagina, which surrounds, and in a great part conceals, the Trunk of the corresponding Artery.

From this Plexus, numberless Filaments, many of them extremely minute, are produced, which run through the Mesentery, partly with the Blood-vessels, and partly at a distance from them; and which, after supplying the Coats of the Vessels, and the Mesenteric Glands, are distributed to the small Intestines in general, and to the Right Portion of the Colon.

The Nerves of the Colon, corresponding with the parts they have to supply, are larger than those of the small Intestines, and in several places form arches, which are situated at the sides of the Arteries.

The Cœliac Ganglia send down, along the Aorta, a Vagina similar to that surrounding the Superior Mesenteric Artery, which is joined by other Nerves from the Trunk of the Sympathetic continued along the Lumbar Vertebræ.

### INFERIOR MESENTERIC PLEXUS.

From the Aortic Vagina or Plexus, a Process is sent off, termed INFERIOR MESENTERIC PLEXUS, which surrounds the Trunk of the Inferior Mesenteric Artery, and follows it to the Left portion of the Colon, and to the Rectum;—the Nervous Filaments forming Arches in several places, as in the Superior Mesenteric Plexus.

### AORTIC AND HYPOGASTRIC PLEXUS.

The Aortic Plexus, receiving fresh supplies from the Trunks of the Sympathetics, sends down a Plexus, commonly termed *Hypogastric*, which passes over the end of the Aorta, and, upon the Last Lumbar Vertebra, splits into right and left Portions, which descend to the Viscera contained in the Pelvis.

# *NERVES*

## OF THE

## ORGANS OF URINE AND GENERATION.

The NERVES of the Organs of Urine and Generation consist of the *Renal* and *Hypogastric Plexus*, and of the *Spermatic* and *Pudic Branches*.

### RENAL PLEXUS.

The RENAL PLEXUS is composed of Nerves sent from the Cœliac Ganglia, joined by some others derived from one or two of the Ganglia of the Sympathetic Nerve in the bottom of the Thorax.

It is interspersed, at its beginning, with small Ganglia termed *Renal*, and is afterwards divided into Anterior and Posterior Plexuses, which extend along the corresponding Surfaces of the Renal Artery, accompanying the Branches of that Vessel in the Substance of the Kidney.

From the Renal Plexus, Small Nervous Twigs ascend to the Renal Gland, which is furnished with others from the Cœliac Ganglia and root of the Hepatic Plexus.

The Renal Plexus also sends down Filaments to supply the upper portion of the Ureter,—the under receiving Nerves from the Hypogastric Plexus.

## HYPOGASTRIC PLEXUS.

The HYPOGASTRIC PLEXUS, the origin and course of which have been already mentioned, is connected by different Nerves to the adjacent Trunks of the Great Sympathetic and Sacral Nerves, and sends many Branches to the Rectum, Bladder, and Spermatic Vessels in the Male; and to the Rectum, Bladder, Uterus, and Vagina in the Female.—The Nerves of the Uterus are proportionally small.—They pass into its Substance at the Cervix Uteri, and follow the course of the Blood-vessels.

## NERVI SPERMATICI.

The Spermatic Nerves are very minute; they consist of a Superior or Internal, and of an Inferior or External Set of Capillary Branches.

The former are derived from the Renal and Aortic Plexuses, and accompany the Spermatic Blood-vessels in their course through the Abdomen, and afterwards in their descent to the Testicle.

The latter are sent off from a Branch of the second Lumbar Nerve, which, running near the Spermatic Vessels, detaches a Filament, which, in the Male, goes in the Spermatic Cord towards the Testicle, but is more particularly dispersed upon the Cremaster. In the Female, Filaments are reflected from it along the Ligamentum Rotundum to the Uterus.

NERVI

### NERVI PUDICI.

The NERVI PUDICI arise in two Fasciculi,—a *Superior* and *Inferior*,—which are formed by Fibrillæ from all the Cords entering into the composition of the Sciatic Nerve.

The Superior Fasciculus consists, more particularly, of Threads from the two under Lumbar and two upper Sacral Nerves;—the Inferior is composed of a small Cord from the Second, and a large one from the Third Sacral.

The Fasciculi pass through the under part of the Notch of the Os Ilium, and afterwards go between the Sacro-Sciatic Ligaments, and follow the Pudic Blood-vessels, anastomosing in some places with each other by oblique Filaments.

They send many Branches to the Muscles and other parts about the Anus and Perinœum, and then pass forwards to supply the different parts of the Penis.

On the Penis, the Nerves follow the course of the Arteries; the Superior Fasciculus constituting the Nervus Dorsalis, and the Inferior giving Branches to the under part of the Organ.

The *Nervus Dorsalis*, which is the most considerable Nerve of the Penis, runs forwards between the corresponding Artery and the Vena Magna, expanding into many Branches, which, after supplying the Corpus Cavernosum and Teguments of the corresponding side, terminate in the Substance of the Glans.

# *NERVES*

# OF THE

# LOINS, PELVIS, AND INFERIOR EXTREMITY.

THE NERVES of the Loins, Pelvis, and Inferior Extremity, consist of the continuation or inferior portion of the Sympathetic, and of the Trunks and Branches of the *Lumbar* and *Sacral* Nerves.

## NERVUS SYMPATHETICUS.

The SYMPATHETIC NERVE, after reaching the Abdomen, makes a sweep forwards first upon the lateral, and then upon the anterior part of the Lumbar Vertebræ, between the Tendinous Crura of the Diaphragm and the Psoas.

It afterwards descends into the Pelvis, nearly of the same size as in the superior parts of the Body, and passes over the anterior Surface of the Os Sacrum, at the inner side of the Great Sacral Foramina.

Towards the lower part of the Pelvis, it becomes considerably smaller, and at last finishes its course upon the

Surface of the Os Coccygis, where it unites into an Arch with its Fellow on the opposite side.

In the Loins, it forms Ganglia similar to those in the Thorax, each of which is connected behind by two or three long slender Branches to the roots of the Lumbar Nerves, and before, by other slender Nerves, to the Aortic Plexus.

In the Pelvis also it forms Ganglia, which are connected to the Sacral Nerves on one side, and to its fellow on the other, by cross Branches.

Filaments are sent off, in the Pelvis, from the Sympathetic, to the Muscles and Membranes about the Os Coccygis, and to the Intestinum Rectum.

## LUMBAR NERVES.

The FIVE LUMBAR NERVES, immediately after emerging from between the Bones, communicate with each other. They are also connected with the Sympathetic Nerve by Branches which run over the sides of the Vertebræ, and send large Branches backwards to the Muscles and Integuments on the posterior part of the Loins.

By their connections with each other, they compose a Plexus termed *Lumbar*, which is situated behind the Psoas. This Plexus sends Branches outwards to the Quadratus Lumborum, and to the Flexors of the Thigh.

The FIRST LUMBAR NERVE is connected by a small Branch to the Twelfth Dorsal, and by its Trunk to the Second Lumbar.

After giving Twigs to the Muscles of the Loins, it detaches a principal Branch, which passes over the Quadratus Lumborum toward the Spine of the Os Ilium, where it sends Branches to the Integuments of the Pelvis, to the upper and outer part of the Thigh, to the under end of the Abdominal Muscles, to the Integuments of the Groin, and to the Pubes and Scrotum.

The SECOND LUMBAR perforates the Psoas, to which it gives Branches, and afterwards runs into the Third.

From the Second Lumbar, and partly also from the First, the *Spermaticus Externus* is sent off, which perforates the upper end of the Psoas, and descends near the Spermatic Vessels to the under part of the Abdomen. Near POUPART'S Ligament, and sometimes much higher, it splits into two Branches. In the Male, one of these Branches goes through the Abdominal Rings, to be dispersed upon the Pubes, Spermatic Cord, Scrotum, and Testis. In the Female, this Branch sends Filaments along the Round Ligament to the Uterus; the remaining part going through the Abdominal Rings to the Mons Veneris and Labia Externa.

The other branch passes out with the Femoral Vessels, and sends Branches to the Inguinal Glands, and to the Integuments of the fore part of the Thigh.

Another Branch is sent from the Second, or from the Second and Third Lumbars, termed *Cutaneus Externus*, which passes behind the Psoas, and across the Iliacus Internus, to the Superior-anterior Spinous Process of the Os Ilium. It afterwards bends over the outer end of POUPART'S Ligament, and descends in the anterior and external part of the Thigh; dividing into Branches, which are chiefly dispersed upon the Integuments covering the Vastus Externus; some Twigs extending as far as the Joint of the Knee.

Branches of the Second, Third, and Fourth Lumbars, form a Nerve of considerable size, called *Obturator* or *Sub-pubial*, which passes between the External and Internal Iliac Blood-vessels, and along the side of the Pelvis.

### NERVUS OBTURATOR.

The OBTURATOR NERVE accompanies the Blood-vessels of the same name through the upper part of the Obturator Muscles and Ligament, and having furnished Branches to the Obturators and Pectineus, it divides into an Anterior and a Posterior Fasciculus; the former dispersed upon the two small Adductors and Gracilis, the latter upon the Adductor Magnus Femoris.

The principal parts of the Trunks of the four upper Lumbar Nerves, especially of the Third and Fourth, unite and form a Nerve of great size, termed *Crural* or *Anterior Femoral.*

### NERVUS CRURALIS.

The CRURAL NERVE, after bestowing Branches upon the Iliacus Internus and Psoas, passes behind, then at the outside of the Psoas, to get to the Thigh.

In its course from the Abdomen, and at the upper part of the Thigh, it is situated at the outside of the

Femoral Artery, which lies between it and the corresponding Vein.

Behind POUPART's Ligament, it is divided into many Branches, which are distributed to the Muscles and Integuments on the fore and lateral parts of the Thigh,—one Branch in particular, termed *Saphænus*, descending upon the Leg.

The Branches are as follow:

The *Cutaneus Medius*, which descends in the fore part of the Thigh, opposite to the inner edge of the Rectus, and supplies the Integuments near it as far as the Knee,—one Branch of it connecting itself with another of the Cutaneus Anterior.

The *Cutaneus Anterior*, more internal than the Cutaneus Medius,—which crosses over the middle of the Sartorius, and, after supplying the adjacent Integuments, terminates in the Skin and Cellular Substance, at the fore and inner part of the Knee.

The *Cutaneus Internus*, still more internal than the former, which passes between the Sartorius and Triceps, and, after giving Filaments to the Integuments at the inside of the Thigh, terminates in the Skin, at the under and fore part of the Knee.

The Deep Branches of the Crural Nerve, which are considerably larger than the Superficial, go to the Pectineus and Triceps, to the Sartorius and Gracilis, and to the four Extensors of the Leg, and also furnish Twigs to the Femoral Blood-vessels.

The *Nervus Saphænus* descends between the Sartorius and Triceps, and afterwards behind the Tendon of the former, to the inner side of the Tibia.

Under the Knee it gives off a Branch, named by FISCHER *Saphænus Minor*, which goes down a little behind the Saphænus, and, furnishing Filaments to the Integuments of the inner and back part of the Leg, terminates behind the Malleolus Internus, on the Integuments of the Foot.

The Trunk of the Saphænus attends the Vena Saphæna Major, sending many Nervous Threads obliquely forwards to the Integuments on the inner and fore part of the Leg, and is at length consumed upon the Skin and Cellular Substance of the upper and inner part of the Foot.

The remaining part of the Fourth Lumbar Nerve, or that portion which does not enter into the composition of the Crural, unites with the Fifth into a Trunk which descends into the Pelvis, to assist in the formation of the Sciatic Nerve.

## SACRAL NERVES.

The SACRAL NERVES consist of small *Posterior*, and large *Anterior* Trunks.

### POSTERIOR SACRAL NERVES.

The POSTERIOR SACRAL NERVES pass out by the Holes in the back part of the Os Sacrum, and are at first concealed by the Ligamentous and Tendinous Expansion which covers that Bone.

After their exit from the Sacral Foramina, they anastomose with each other, and with some of the Branches of the Gluteal Nerves.

They send out a few tender Fibrillæ, which are dispersed upon the Muscles covering the back part of the Os Sacrum, and upon the Glutei and their Integuments.

### ANTERIOR SACRAL NERVES.

Of the Five Anterior Sacrals, the two uppermost are the largest; the rest suddenly diminish in size, the last being the smallest of the Spinal Nerves.

They go through the Holes in the fore part of the Os Sacrum, and, soon after their exit, are united with each other, and with Branches of the Sympathetic Nerve.

The FIRST, SECOND, and THIRD SACRALS join into a Trunk, which receives the common one sent down from the Fourth and Fifth Lumbars, and forms a Plexus which sends out the SCIATIC, the largest Nerve of the Body.

The roots of the Sciatic Nerve give origin to the Fasciculi which compose the Pudic Nerve, formerly described, and also the Gluteal Nerves which are dispersed upon the Muscles of the Hips.

## NERVI GLUTEI.

The GLUTEAL NERVES run in two Fasciculi, a Superior, arising immediately from the Trunk formed by the two last Lumbars, and an inferior, coming off from the two last Lumbars and first Sacral.

The *Superior Fasciculus* goes through the upper part of the Notch of the Os Ilium, to be dispersed upon the two smaller Glutei Muscles.

The *Inferior Fasciculus* passes through the under part of the same Notch, and below the Pyriformis, to be distributed upon the Gluteus Maximus and Integuments.

The FOURTH SACRAL sends Filaments to the Hypogastric Plexus, others to the Muscles and Ligaments of the Os Coccygis; the rest pass outwards to the Muscles and Integuments about the Anus.

The Fifth, which is scarcely above the size of a Filament, passes forwards between the extremity of the Os Sacrum and the beginning of the Os Coccygis. After giving Twigs to the Coccygeus, it perforates the Sacro-Sciatic Ligaments, and terminates in the Muscles and Integuments of the Anus.

## NERVUS SCIATICUS.

The SCIATIC OR ISCHIATIC NERVE passes obliquely through the Notch of the Ilium, under the Pyriformis. It goes afterwards over the other short Rotator Muscles, and is placed between the Tuber Ischii and Trochanter Major, where it is covered by the Gluteus Maximus.

After leaving the Pelvis, it descends in the back part of the Thigh, first between the long Flexors and Adductor Magnus, and then between the latter and Os Femoris, to the Ham, where it obtains the name of *Popliteus.*

In this course, it gives out the following Branches, which supply the Muscles and Integuments on the back part of the Thigh, viz.

Twigs to the Rotators of the Thigh, which come off from it after its passage through the Sciatic Notch:

The *Cutaneus Superior Posterior*, which arises within the Pelvis, and, passing out with the Sciatic, is divided into Branches, some of which are reflected to the Scrotum in the Male, and to the posterior parts of the Labia in the Female; and in both to the Skin about the Anus and Perinœum.—The principal Branches of this Nerve pass downwards, supplying the Integuments of the back part of the Thigh, as far as the bending of the Knee:

A *Branch* to the Long Head of the Biceps:

Two small Nerves, the one termed *Cutaneus Internus Superior*, which comes off near the upper part of the Thigh, and vanishes in the Skin, a little farther down; the other, termed *Cutaneus Internus Inferior*, which arises near the former, goes down the posterior part of the Thigh, and then, descending upon the inner Head of the Gastrocnemius Externus, terminates in the Integuments of the Calf of the Leg:

A *Large Common Trunk*, and sometimes, instead of it, *separate Branches*, which arise near the middle of the Thigh, and are distributed to the Adductor Magnus, Semi-membranosus, Biceps, and Semi-tendinosus.

## NERVUS POPLITEUS.

The POPLITEAL NERVE is situated between the Hamstrings, and between the Skin and Popliteal Blood-vessels.

A little above the bending of the Knee, it is divided into a Small External, and a Large Internal Branch; the former named *Popliteus Externus*, or *Fibular*, and the latter *Popliteus Internus*, or *Tibial Nerve.*

The Tibial and Fibular Nerves adhere, for some way, by Cellular Substance; and even the Trunk of the Sciatic may be split into these two Nerves for a considerable way up the Thigh.

## NERVUS FIBULARIS.

The FIBULAR, termed also PERONEAL NERVE, sends off, at its beginning, the *Cutaneus Externus*, which is a small Branch giving Twigs to the under end of the Biceps, and which, after running down to the outer Head of the Gastrocnemius, disappears in the Integuments of the same side of the Leg.

Over the outer Condyle of the Os Femoris, it gives off another *Cutaneous Branch*, which descends upon the

Gastrocnemius, and, after anastomosing with a Branch of the Tibialis, goes along the outer part of the Leg, and terminates in the Integuments of that side of the Foot.

The Fibular Nerve afterwards passes over the Head of the Fibula, and divides into *Superficial* and *Deep Branches*, which supply the Muscles and Integuments of the outer and fore part of the Leg.

The *Superficial Fibular* crosses over the Fibula, immediately under its Articulation, and, perforating the Peroneus Longus, and going over the Brevis, it gives Branches to both, and afterwards becomes Subcutaneous, about the middle of the outer part of the Leg.

It sends Branches to the Metatarsus, and to the Extensor Digitorum Brevis; and others, which, after anastomosing upon the upper part of the Foot, furnish Dorsal Branches to the larger Toes.

The *Deep Fibular Nerve* crosses over the Fibula, immediately above the former, and divides into several Branches, viz.

A *Reflected Branch* to the soft parts of the Joint:

A *Branch* to the Peroneus Longus:

A *Branch* to the Tibialis Anticus:

*Branches* to the Extensor Pollicis, and Extensor Digitorum Longus:

*Filaments* which creep along the Periosteum of the Tibia, and *others* which adhere to the Coats of the Tibial Artery.

The longest Branch of the Nerve accompanies the Anterior Tibial Artery, and divides upon the Foot into Branches, which have some connection with each other, and supply the Extensor Digitorum Brevis.—Some Filaments continued from these Branches run to the Interossei, while others of more considerable size go to some of the innermost Toes; one Twig sinking, with a Branch of the Anterior Tibial Artery, to the Deep Muscles of the Sole.

## NERVUS TIBIALIS.

The TIBIAL NERVE passes between the Heads of the Gastrocnemius, and, perforating the origin of the Soleus, descends between it and the Flexor Digitorum Longus, upon the Posterior Tibial Artery, to the under part of the Leg; in which course, it sends off the following Nerves, viz.

The *Communicans Tibiæ*, which accompanies the Vena Saphæna Minor in the back part of the Leg, and to the outer part of the Foot.

Behind the Belly of the Gastrocnemius, the Communicans sends a Branch to be consumed in the Fat; and a little lower, it anastomoses with the communicating Branch of the Fibular Nerve.

The under part of this Nerve is dispersed upon the Integuments of the outer Ankle and adjacent side of the Foot, some Branches passing as far as the Dorsal side of two or three of the smaller Toes:

*Branches* to both Heads of the Gastrocnemius, to the Plantaris, and to the Soleus.

Near the middle of the Leg, it sends Branches to the Tibialis Posticus, to the Flexor Digitorum, and Flexor Pollicis.

One or two *Cutaneous Branches*, dispersed upon the Skin at the under and inner part of the Leg.

Near the Ankle, a *Branch* which passes behind the Tendo ACHILLIS, principally to the Integuments of the outer and back part of the Foot.

The Tibial Nerve passes afterwards between the Arteries and Os Calcis into the Sole.

## PLANTAR NERVES.

In the hollow of the Os Calcis, after detaching Branches to the parts adjacent, the Tibial Nerve divides into *Internal* and *External Plantar Nerves*, which are nearly of equal size.

The INTERNAL PLANTAR NERVE runs near the inner side of the Sole, sends Filaments to the Adductor Pollicis, Flexor Digitorum Brevis, and Flexor Digitorum Accessorius, and Twigs to the Lumbricales.

It afterwards gives out four large Branches, splitting into others, which run with the Arteries along the Plantar sides of the three first Toes, and inner side of the Fourth Toe,—in the manner the Radial Nerve runs along the corresponding Fingers.

The EXTERNAL PLANTAR NERVE sends Branches to the Heel, and passes with the Artery of the same name to near the outer edge of the Sole, where it splits into three principal Branches.

The two first run to the adjacent sides of the Fourth and Fifth Toes, and outer side of the Little Toe; the inner one often anastomosing with a corresponding Branch of the Internal Plantar.

The third forms an Arch corresponding with that of the External Plantar Artery, furnishes Branches to the short Muscles of the Little Toe, to the Interossei, Lumbricales, and Transversalis, and terminates in the short Muscles of the Great Toe.

The Plantar Digital Nerves send Filaments to the Integuments, and upon the Toes anastomose with each other, and with the Dorsal-digital Nerves,—as the Palmar-digital do in the Hand.

# PART VIII.

OF

# THE GLANDS.

## OF

# THE GLANDS.

## OF THE GLANDS IN GENERAL.

Glands are circumscribed organic Substances, of a peculiar appearance and structure, belonging to the soft parts, inclosed in proper Membranes, and destined for altering or secreting particular Fluids from the general mass of Blood, or for making certain changes upon the Fluids absorbed, so as to answer various purposes in the animal economy.

The name has been originally derived from the word *Glans*, a Nut or Acorn, to which some of them bear a sort of resemblance.

They vary extremely in figure, size, colour, consistence, and office in the same Person, and in number and size in different Persons; and though readily known from their appearance, it is difficult to give such a correct definition of them as to include all true Glands, and exclude every other part of the Body.

Some are of a round or oval form, as the Lymphatic

Glands and the Spleen; others are oblong, as the Pancreas; or some are of a triangular shape, as the Renal Glands, &c.

Some are hard and firm, with unequal surfaces, as the Mamma; others soft, loose, and tender, and smooth externally, as the Spleen;—their softness or firmness depending much on the nature of their Cellular texture.

Some are of great size, as the Liver; others remarkably small, as the Ceruminous Glands of the Ear.

Some are of a whitish colour, as the Mamma; or pale-red and yellowish, as the Salivary Glands. Some of a red colour, as the Kidneys and Thyroid Gland; or yellow or brownish, as the Glandula Renalis; or purple, and verging upon black, as the Bronchial Glands.

Glands are composed of Arteries, Veins, Lymphatic Vessels, and Nerves, connected together by Cellular Substance.

They are destitute of Fleshy or Muscular Fibres, and have little or no Fat.

They have a structure different from that of every other part of the Body.

Some of them are a little Spongy; and when deprived of their Blood, many of them have the appearance of Wool.

With respect to their ultimate structure, different opinions are entertained;—the most prevalent are those of Malpighi and Ruysch.

According to the idea of the former Author, Glands contain Acini, the extreme Arteries of which terminate, partly in corresponding Veins, and partly in Corpora

Globosa, Cryptæ, or little Follicles, from the opposite sides of which Excretory Ducts are sent out.

In the Mamma, after a minute Injection, the Folliculous appearance is more distinct than in other Glands. In the Liver it is much less so. In the Salivary Glands, there is an appearance like the Cells of the Lungs, the Follicles seeming to communicate and to open into Ducts, as the Cells do into the Branches of the Trachea.

According to RUYSCH, the Arteries in the Glands, wonderfully convoluted, terminate, partly in Red Veins, and partly in Excretory Ducts, without the intervention of Follicles; and he asserts, that the Follicles described by MALPIGHI may, by a good Injection, be entirely converted into Vessels, and all of these having a Cylindrical form.

Of the two opinions mentioned above, that of RUYSCH appears to have gained most advocates, though the question is certainly by no means yet sufficiently decided; nor does it even seem to be more so than when it was at first proposed.

Most of the English Authors consider the Glands to be a composition of Arteries convoluted, or not convoluted, from the extremities, or sides of which, but particularly from the former, the Excretory Ducts are supposed to arise, so as to receive the proper Juices.

The Glands are divided by Authors into different Classes, according to their Fabric, or to the Liquor they secrete.

The most general Division is the original one of SYLVIUS, into Conglobate and Conglomerate, the former of a roundish shape, and belonging to the Lymphatic System; the latter Lobulated, and the Lobules having proper Ducts, into which the secreted Liquor is discharged; or they are formed of small Corpuscles, or little Kernels, termed Acini, collected into a Mass.

WINSLOW retains this division, but makes a subdivision of the Conglomerate, into Simple and Compound Glands.

MALPIGHI adds what he calls the Simple Glands, or Simple Folliculous Glands, as those in the Fauces, &c.

To the above some add Conglutinate, Congregate, Vesicular, Vascular, and Anonymous.

Some divide them according to the Fluids they discharge, viz. the Lymphatic, Secretory, and Anonymous, which includes every species of secreting Substance.

Or they are divided, according to their Fabric, into Simple, Conglobate, and Compound or Conglomerate.

The *First* of these consist of hollow Follicles, Mucous Sinuses, or Cylindrical Mucous Fistulæ, inclosed in a proper Membrane, and having no Excretory Duct.

In this Class are included the Mucous Follicles of the Nose, Fauces, Intestines, &c. When these are separate, they are termed Simplices Solitariæ, and when collected into a group, they are called Simplices Aggregatæ.

The *Second* Class includes the Conglobate Glands which belong to the Absorbent System, where the Glands appear first to have got their name.

They are inclosed in a proper Membrane, are Orbicular or Oval, of different sizes, and situated near the Blood-vessels.

They have no proper Duct, but receive the Lymph, and soon discharge it again.

The *Third* Class comprehends those formed of Acini collected into a Mass, or of a Congeries of Lobules and Acini joined within a common Membrane by loose Cellular Substance, which braces them, and allows the Vessels and Nerves to pass between them.

When viewed by a good Magnifier, the Acini are observed to be subdivided by Cellular Substance into smaller parts, and these into parts still smaller, till the Eye loses sight of the division.

From the Acini innumerable Excretory Ducts are sent out, which by degrees join into one or more common Tubes, that carry out the Liquor they receive.

To this Class belong the Mucous Glands of the Lips, Palate, and Root of the Tongue; the Salivary Glands, Pancreas, Liver, and Kidneys; some of the Glands of the Organs of Generation, as the Testes, Prostate, &c. The Brain, also, may be looked upon as a Gland, and ranked in this Division.

Besides these there are Anomalous Glands, Conglomerate in their structure, but destitute of any apparent Excretory Duct. This Class includes the Thyroid, the Thymus, the Renal Glands, and the Spleen.

## VESSELS AND NERVES OF GLANDS.

The Arteries of Glands are larger, and more numerous, than in any other part of the Body.

They are derived from those of the adjacent parts, and have their size proportioned to the quantity of

Fluids they are destined to secrete;—examples of which are seen in the Kidneys, Testicles, &c.

The Surculi, or Branches of Arteries in Glands, are innumerable. They are formed into Racemi and Pedunculi, as may be seen after Maceration for some time in Water.

The Veins of Glands are destitute of Valves, excepting those from the Testicle, and sometimes also those from the Mamma.

They are fewer in number, but many of them are larger and more lax than in other parts, and may be either larger or smaller than the corresponding Arteries.

The communications between the Arteries and Veins are more remarkable in some Glands than in others. Thus, in the Kidney, an Injection passes with greater facility from the Artery to the Vein than it does in the Brain.

The Absorbents are generally very numerous, and divided into a Superficial and a Deep Set. They are plentifully supplied with Valves, and have many anastomoses with each other, both in the Substance and on the Surface of the Gland.

The Nerves of Glands are rather numerous than large; like the Arteries, they generally go in at a particular part of the Gland. They accompany the Blood-vessels, but become extremely small before they reach the surface of the part upon which they are spent.

The Excretory Ducts begin by innumerable Branches continued from the Acini, but are at first invisible, being considered to be still smaller than the Arteries which give origin to them;—and smaller also than the

Veins, for LEEUENHOECK, by means of his Glasses, could perceive the origins of the one, but was unable to discover those of the other.

They generally unite into larger Branches, and these, in their progress, into still larger, till a Trunk is formed; or they join something in the manner of the Roots of a Tree, as is the case in the Liver, &c.; or they form different Trunks, as in the Mamma and Prostate Gland.

The Excretory Ducts are proportionally of a stronger texture than either the Arteries or the Veins; but in this they vary much among themselves,—some, as the Parotid Duct and Vas Deferens, being thick and strong,—while others, as the Pancreatic, are so thin as to be semi-transparent.

Each is composed of an outer and inner Membrane, and these, in the Ureter, have a Muscular Coat between them; but in other Ducts their Muscularity is not apparent.

The Inner Coat, or Lining, probably continued from the Arteries, is a Mucous Membrane, in which, as in the Biliary Ducts, the Mouths of the Mucous Follicles can frequently be distinctly seen.

The Excretory Ducts are straight in some Glands, as the Kidney; tortuous in others, as the Testicle;—or short in some, and long in others, in consequence of which the Fluids may be transmitted with different degrees of facility.

The Excretory Ducts are destitute of Valves, though in some, as the Cystic Duct of the Liver, there is a

Cellular Structure within, which retards the motion of the secreted Fluids.

The Ducts discharge their contents in consequence of a *Vis a Tergo* from the Heart and Arteries,—of pressure from the surrounding parts,—of the Pulsation of the Arteries near them,—to which may probably be added, a small degree of contractility in the Ducts themselves.

Many of the Ducts terminate obliquely, others are surrounded at their termination by a Papilla, both of which circumstances contribute to prevent the return of the Fluids they discharge.

Many of them have Receptacles attached to them, which vary much in size in different parts of the Body. These serve to receive the Fluids from the Ducts, and retain them till an occasion occurs for their being discharged.

The Receptacles are termed *Aperta*, or *Cæca*, according as they possess outlets, or the reverse, for the discharge of the Excretions.

The Receptacula Aperta have Orifices by which the Humours are allowed to escape, as in the case of the Bladder of Urine, Gall-bladder, &c.; and these are shut or opened as circumstances may require, and this owing to the irritability of the part,—its mechanical power,—the action of the surrounding Viscera,—the acrimony and quantity of the Fluids contained, &c.

The Receptacula Cæca are shut Sacs, destitute of any visible opening for the discharge of the Excretions, as is the case with the Cavities of the Joints, the only outlet here being the Absorbent Vessels.

The

## LIST OF THE PARTICULAR GLANDS.

*In the Cavity of the Cranium.*—The Glands of PACCHIONI, upon the Surface of the Dura Mater,—Globular Bodies frequently met with in the Choroid Plexus, sometimes considered as Glands,—Glandula Pinealis,—Glandula Pituitaria.

*Upon the Outer Part of the Head.*—The Temporal, Occipital, and Maxillary Lymphatic Glands.

*About the Eye.*—The Glandulæ Sebaceæ of the Eyelids,—Glandula Lacrymalis,—the Caruncula Lacrymalis at the Inner Corner of the Eye.

*Glands of the Nose.*—Glandulæ Membranæ Pituitariæ,—the Glandulæ Sebaceæ of the Integuments of the Nose.

*Glands of the Ear.*—The Glandulæ Ceruminosæ of the Meatus Auditorius,—the Glandulæ Sebaceæ in the Integuments of the Ear.

*Glands of the Mouth.*—Glandulæ Parotis,—Maxillaris Inferior,—Buccales,—Molares,—Labiales,—Palatinæ.

*Glands of the Fauces.*—Amygdalæ,—Glandulæ Palatinæ,—Linguales,—Uvulares.

*Glands of the Neck.*—Glandula Thyroidea,—Jugulares, seu Concatenatæ Colli,—Laryngeæ Tracheales,—Pharyngeæ,—Esophageæ.

*Glands of the Thorax.*—Glandulæ Thymus,—Bronchiales,—the Mammæ,—the Sebaceous Glands of the Areolæ of the Mammæ,—the Lymphatic Glands of the Mammæ, and of other parts of the Thorax in general.

*Glands of the Abdomen.*—The Liver,—Spleen,—Pancreas,—Kidneys,—Renal Glands,—Glandulæ Intestinales,—Mesentericæ,—Lumbares, and various other Conglobate Glands belonging to the Abdominal Viscera.

*Glands of the Pelvis, and Organs of Generation in the Male.*—The Testes,—Glandula Prostata,—COWPER's Glands,—the Mucous Glands of the Urethra,—the Odoriferous Glands of the Penis,—the Sebaceous Glands of the Skin of the Penis, Scrotum, and Anus,—the Conglobate Glands in the vicinity of the principal Blood-vessels, as the Iliac, Sacral, &c.

*Glands of the Parts of Generation in the Female.*—The Ovaria,—the Glands in the Cervix Uteri and in the Vagina,—the Odoriferous Glands of the Labia Externa, Nymphæ, and Clitoris,—the Conglobate Glands in the vicinity of the Principal Blood-vessels, as the Iliac, Sacral, &c.

*Glands of the Extremities.*—The Popliteal,—Inguinal,—Brachial,—and Axillary Conglobate Glands,—and the Axillary and Inguinal Sebaceous Glands.

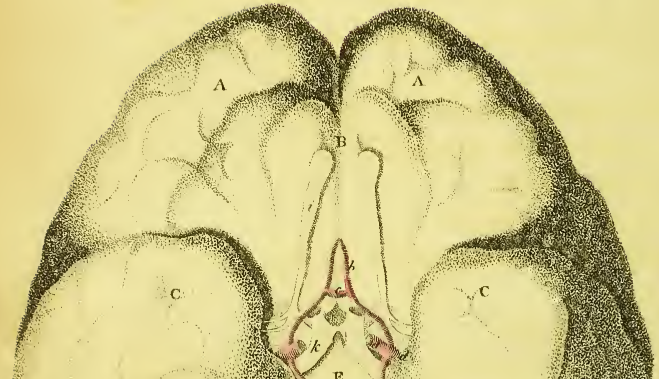
## OF SECRETION.

With respect to the manner in which Glands operate in performing Secretion, Anatomists are entirely ignorant, though much must depend upon the structure of the Organ where the Secretion is made,—the distribution of the Arteries,—the velocity of the passage of the Fluids,—the Intestine motion,—and the mixture produced.

Secretion has been supposed by some Authors to be owing to the Glands acting as Filters upon certain Fluids which have been considered to pre-exist in the Blood; and this filtering has been thought to depend upon the diameters of the Vessels or parts through which they pass,—or it has been thought to be owing to the action of the Vessels,—or to absorption from Follicles, after the Fluids have been thrown into them, —or to the power of the Glands, of converting part of the Blood into these Fluids,—or to a kind of Fermentation in the Fluids themselves,—or to several or all of these powers, assisted by a variety of other circumstances;— as the situation of the Glands with respect to the Heart, —the size of the Arteries entering the Glands,—the difference of communication between the Arteries and Veins,—the convolutions of the former,—the number of Branches sent off from them,—the angles they form, —the thickness of their Coats,—their sensibility,—certain chemical attractions, combinations, and decompositions produced, according to the different diameters of the Secreting Vessels, &c.

# GLOSSARY.

TAB. XXXI.



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# TABLE XXXI.

A View of the Base of the Brain, and Trunks of its Principal Arteries, with the Origin of the Nerves which go through the Cranium.—The Arteries are lettered on the one side, and the Nerves on the other.

A, A, The anterior lobes of the brain.

B, The division of the anterior lobes.

C, C, The lateral lobes.

D, D, The posterior lobes.

E, The infundibulum, supported upon the union of the optic nerves.

F, the corpora albicantia.

G, G, H, H, The cerebellum. G, G, Its superior anterior lobules.

I, The tuber annulare.

K, The medulla oblongata, and beginning of the spinal marrow.

*a*, A section of the internal carotid artery, after it has entered the cranium.

*b*, The anterior branch of the internal carotid, approaching its fellow of the opposite side.

*c*, A cross branch, by which the two anterior branches communicate.

*d*, The lateral branch of the internal carotid, disappearing in the fossa of Sylvius.

*e*, The branch by which the internal carotid communicates with a branch of the basilar artery, to form a part of the circle of Willis.

*f*, The

## TABLE XXXI. CONTINUED.

*f*, The vertebral artery, sending branches to the cerebellum and spinal marrow.

*g*, The basilar artery, formed by the union of the vertebral arteries, and sending branches to the tuber annulare, and a large branch on each side to the cerebellum.

*h*, The division of the basilar artery into four branches; the two posterior going chiefly to the cerebellum, and the two anterior, after communicating with the internal carotids, dispersed upon the brain.

*i*, The olfactory, or first pair of nerves, having different roots behind, and a bulbous extremity before.

*k*, The optic nerve, united before the infundibulum to its fellow of the other side.

*l*, The third pair.

*m*, The fourth pair.

*n*, The fifth pair, formed of fasciculi.

*o*, The sixth pair.

*p*, The seventh pair, composed of the portio dura before, and the portio mollis behind; with some small communicating threads between them.

*q*, The eighth pair, formed before of the nervus glossopharyngeus, and behind of the par vagum, composed of small fasciculi.

*r*, The ninth pair, arising in fasciculi.

*s*, The accessory nerve of the eighth pair.

*Fig. 1.*

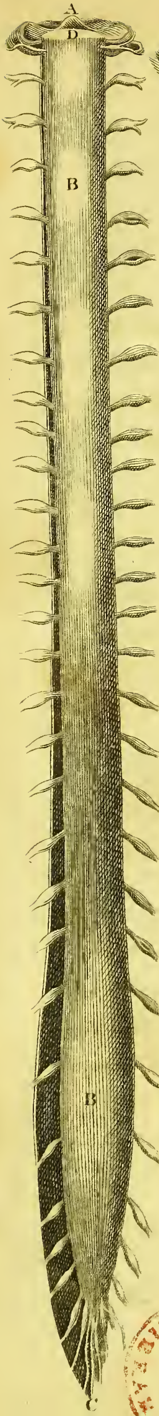


*Fig. 2.*

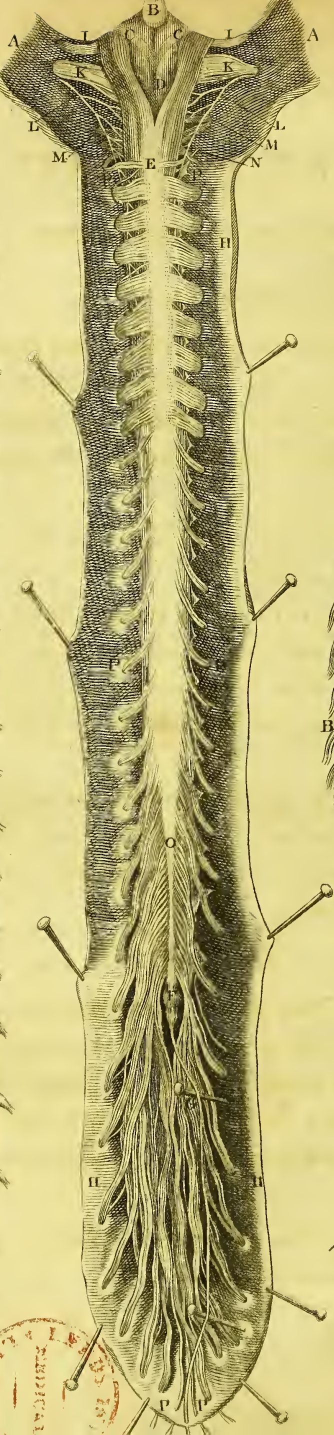
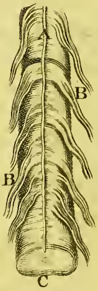


*Fig. 3.*



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# TABLE XXXII.

## Views of the Spinal Marrow.

### FIG. 1.

*Presents a posterior View of the Production of the* Dura Mater, *investing the* Spinal Marrow *and its* Nerves; *together with the Direction, Situation, and proportional Size, of the* Vertebral Nerves *in the* Specus *of the* Spine.

A, A portion of the first vertebra, and the processus dentatus of the second.

B, B, The covering of the spinal marrow, produced from the dura mater, continued from the foramen magnum of the occipital bone to the middle of the os sacrum.

C, A ligament continued from the spinal marrow to the os coccygis.

D, A section of the spinal marrow at its origin.

On each side of the spinal marrow are seen the thirty pair of spinal nerves with their ganglia, also covered with the dura mater.

### FIG. 2.

*Gives a Posterior View of Part of the* Medulla Oblongata, *and the whole of the* Spinal Marrow *produced from it, lying in its natural Situation within the Sheath of the* Vertebræ, *which is concealed by the Sheath of the* Dura Mater *being laid open longitudinally, and pinned back.*

A, A, Portions of the os petrosum and os occipitis, covered with the dura mater.

B, The vermiform process of the cerebellum.

C, C, Part of the medulla oblongata.

D, The calamus scriptorius, in the bottom of the fourth ventricle.

E, The beginning of the spinal marrow.

F, The termination of the spinal marrow in two little eminences.

G, A ligament running from the under end of the spinal marrow, through the dura mater, to be fixed to the os coccygis.

H, H, &c. The dura mater, cut and pinned back.

I, I, The seventh pair of nerves.

K, K, The eighth pair.

L, L, The nervus accessorius, arising by different roots from the upper end of the spinal marrow.

M, M, The ninth pair of nerves.

N, The upper end of the ligamentum denticulatum of this side, adhering to the dura mater. In the interstices of the spinal nerves the teeth of this ligament are seen inserted into the dura mater, as far as the under end of the spinal marrow.

O, The under part of the spinal marrow, sending off the nerves which form the cauda equina.

P, P, &c. The posterior origins of the thirty pair of spinal nerves, and their situation within the dura mater; together with the appearance of the filaments which form them.

## TABLE XXXII. CONTINUED.

### FIG. 3.

*Represents a* PORTION *of the* SPINAL MARROW, *taken from the Upper Part of the Back,—viewed anteriorly.*

A, A ligament produced from the pia mater, inserted into the medullary substance.

B, B, The anterior origins of the spinal nerves, formed of fasciculi of filaments.

C, A section of the spinal marrow, shewing the medullary circumference and crucial figure of the cineritious centre.

# TABLE XXXIII.

Represents the Blood-Vessels and Nerves seen on the Fore Part of the Superior Extremity. The Figures belong to the Right Side.

## FIG. 1.

*The* Arm *of a Young Subject, with the* Arteries *injected, and the* Muscles *dried.*

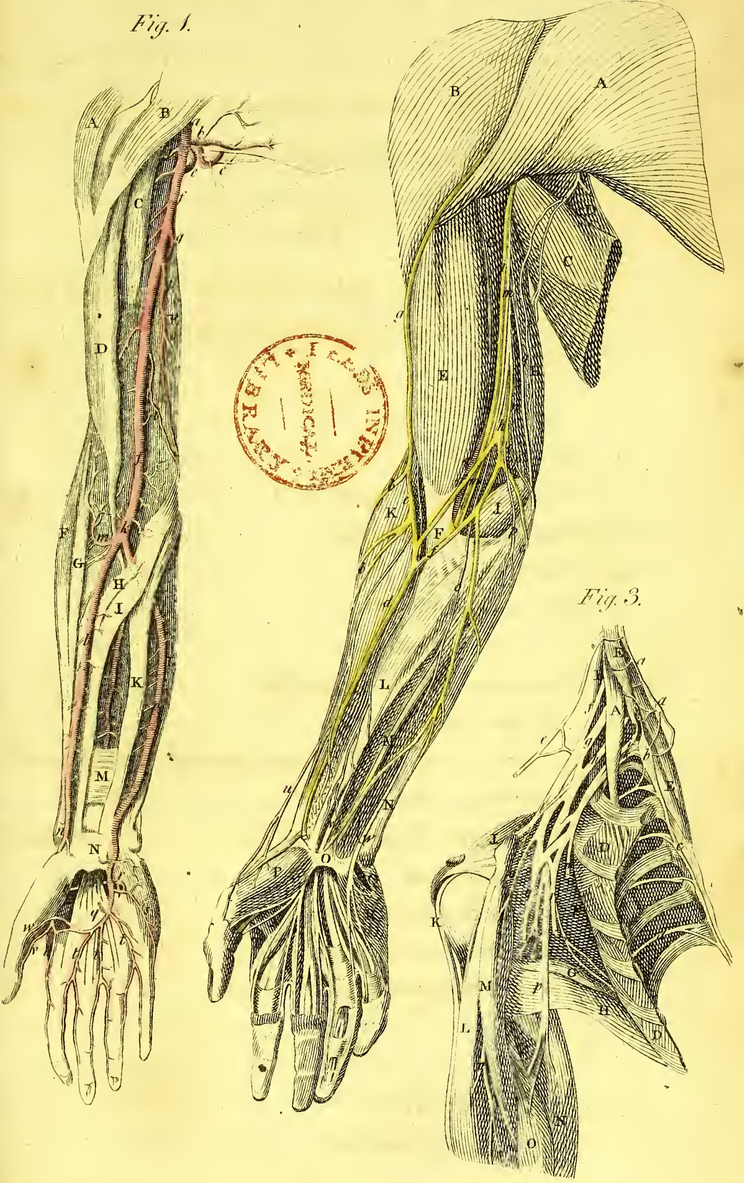
### Muscles.

A, The deltoid.
B, The pectoralis major.
C, The coraco-brachialis.
D, The biceps.
E, The triceps.
F, The supinator longus.
G, The extensores carpi radiales.
H, The pronator teres.
I, The flexor carpi radialis and palmaris longus pulled towards the radius.
K, The flexores digitorum sublimis et profundus drawn towards the ulna.
L, The flexor carpi ulnaris.
M, The pronator radii quadratus.
N, The ligamentum carpi annulare.

### Arteries.

*a*, The axillary artery.
*b*, The scapularis interna.

TAB. XXXIII.



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## TABLE XXXIII. CONTINUED.

*c*, The dorsalis scapulæ inferior, turning round the under edge of the scapula.

*d*, The circumflexa anterior.

*e*, The circumflexa posterior.

*f*, *f*, The trunk of the humeral artery, sending branches to the biceps and other muscles of the arm.

*g*, The profunda, or spiralis.

*h*, The profunda minor.

*i*, The ramus anastomoticus magnus.

*k*, The division of the humeral artery into radial and ulnar arteries.

*l*, The radial artery, sending numerous branches to the muscles next the radius.

*m*, The recurrent branch of the radial artery.

*n*, The under end of the radial artery, after giving off the superficial volar branch, turning between the metacarpal bones of the thumb and fore-finger, to form,

*o*, The deep arch of the palm.

*p*, The ulnar artery, pulled a little towards the inner side of the arm, to shew the branches it sends to the corresponding muscles.

*q*, The superficial palmar arch, formed by the ulnar artery.

*r*, The deep palmar branch of the ulnar artery, anastomosing with the arcus profundus of the radial artery, behind the tendons of the flexors of the fingers.

*s*, A branch to the inner side of the little finger.

*t*, *t*, *t*, The three large digital branches of the ulnar artery, sending branches to the fingers.

*u*, A branch from the conjoined radial and ulnar arteries to the radial side of the fore-finger.

*v*, A similar branch from these arteries to the thumb.
*w*, Another branch to the thumb from the ulnar artery.

## FIG. 2.

*Represents the First Layer of* MUSCLES, *with the Subcutaneous* BLOOD-VESSELS *and* NERVES *of the Superior Extremity.*

A, The pectoralis major.
B, The deltoides covered with cellular membrane.
C, The latissimus dorsi.
D, Part of the intercostales.
E, The biceps flexor cubiti.
F, The round tendon of the biceps, with its aponeurosis extending to the inside of the fore-arm.
G, The coraco-brachialis.
H, The triceps extensor cubiti.
I, The pronator teres.
K, The supinator radii longus.
L, The flexor carpi radialis, and,
M, The palmaris longus, lying over the flexor digitorum sublimis.
N, The flexor carpi ulnaris.
O, The ligamentum carpi annulare.
P, The abductor pollicis.
Q, The abductor minimi digiti.
R, The flexor parvus minimi digiti.
S, The adductor pollicis.
T, The abductor indicis.

Upon the palm of the hand, and corresponding side of the fingers, the tendons of the flexores digitorum appear, with the lumbricales, and part of the sheath of the tendons.

## BLOOD-VESSELS.

*a*, The brachial artery, appearing near the inner edge of the tendon of the biceps, where it may always be felt.

*b*, *b*, Superficial radial veins passing to the cephalic vein.

*c*, *c*, Superficial ulnar veins running to the basilic.

*d*, The mediana longa.

*e*, The mediana cephalica.

*f*, *f*, Two median basilic veins, found in the subject the figure was taken from.

*g*, The vena cephalica.

*h*, The basilica.

*i*, *i*, Deep humeral veins accompanying the artery.

## NERVES.

*k*, The musculo-cutaneus.

*l*, The trunk of this nerve getting from behind the biceps, and dividing into branches, which extend along the fore arm as far as the wrist.

*m*, *m*, The trunk of the radialis, covering part of the humeral artery.

*n*, The cutaneus.

*o*, *o*, The branches of the cutaneus passing partly over, and partly under, the cutaneous veins, some of its twigs proceeding as far as the wrist.

*p*, *p*, Branches of that nerve to the inner and back part of the fore-arm.

*q*, The ulnaris.

*r*, A branch from the second intercostal nerve.

*s*, A branch of that nerve to the inner side of the arm.

*t*, Another branch of that nerve which gives branches to the mamma.

*u*, The volar branch of the spiral nerve running to the muscles of the thumb.

*v*, The trunk of the radial nerve, passing under the annular ligament of the wrist, and afterwards sending two branches to the thumb, two to the fore-finger, and one branch to the radial side of the ring-finger.

*w*, The trunk of the ulnar nerve, sending branches to the inner side of the palm, and afterwards two branches to the little finger, and one to the ulnar side of the ring-finger.

### FIG. 3.

*Shews the* BRACHIAL PLEXUS *of* NERVES, *and the Union of the* INTERCOSTALS *with the* GREAT SYMPATHETIC NERVE.

#### MUSCLES.

A, The scalenus anticus.
B, The scalenus medius.
C, The scalenus posticus.
D, D, The intercostales.
E, E, The longus colli.
F, The subscapularis.
G, The teres major.
H, The latissimus dorsi.
I, The supra-spinatus.
K, The long head, and,
L, The short head of the biceps.
M, The coraco-brachialis.
N, The long, and,
O, The short head of the triceps.

# TABLE XXXIII. CONTINUED.

## NERVES.

*a*, *a*, The trunk and middle cervical ganglion of the great sympathetic nerve, with its connection to the cervical nerves.

*b*, The inferior cervical, and first dorsal ganglia, of the great sympathetic nerve, conjoined in this figure.

*c*, The trunk of the great sympathetic nerve within the thorax, with its connections to the intercostals.

*d*, The trunk of the fifth intercostal nerve.

*e*, The trunk of the phrenic nerve, which is here turned aside, arising from, or connected with, the third and fourth cervicals.

*f*, The fourth,

*g*, The fifth,

*h*, The sixth, and,

*i*, The seventh cervical nerve.

*k*, The first dorsal nerve, joined to the seventh cervical.

From the four inferior cervical nerves and first dorsal, the *axillary plexus* is formed, which sends off the following nerves to the superior extremity, viz.

*l*, The scapularis.

*m*, The articularis.

*n*, The cut trunk of the cutaneus.

*o*, *o*, The musculo-cutaneus, perforating the coraco-brachialis muscle.

*p*, The spiralis.

*q*, The radialis cut across.

*r*, The ulnaris also cut across.

*s*, A branch to the teres major and latissimus dorsi.

# TABLE XXXIV.

SHEWS the MUSCULAR NERVES of the INFERIOR EXTREMITY of the Right Side.

## FIG. 1.

*Gives a* VIEW *of the* PRINCIPAL MUSCULAR NERVES *seen on the Fore part of the Inferior Extremity.*

A, The iliacus internus.
B, The psoas magnus.
C, The psoas parvus.
D, The quadratus lumborum.
E, Part of the gluteus medius.
F, The gluteus minor.
G, The cruralis.
H, The vastus externus.
I, The vastus internus.
K, The tendon of the rectus inserted into the patella.
L, The pectineus.
M, The adductor longus femoris, divided, to shew the nervus obturatorius.
N, The gracilis.
O, The adductor magnus femoris.
*o*, The femoral artery.
P, The biceps cruris.
Q, The tendon of the gracilis, inserted into the tibia.
R, The peroneus longus.
S, The peroneus brevis.
T, Part of the fibula.
U, The tibialis posticus.

TAB. XXXIV.

Fig. 1.

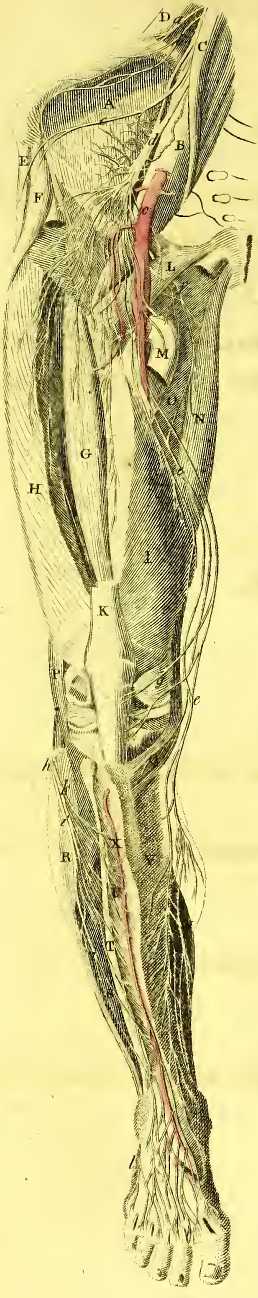


Fig. 2.

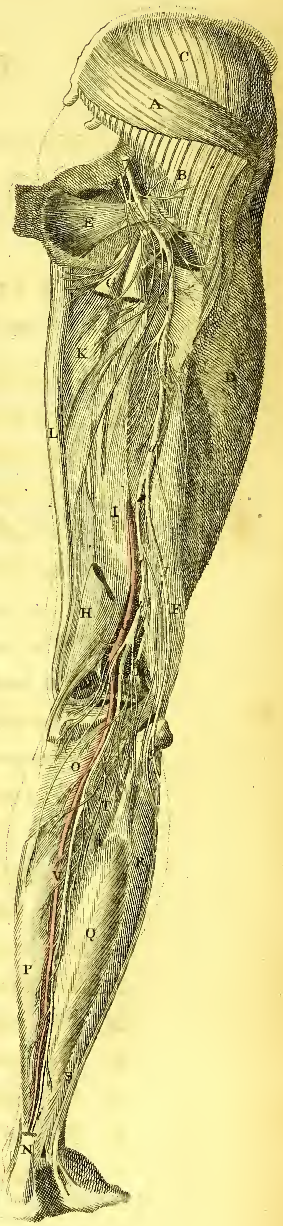
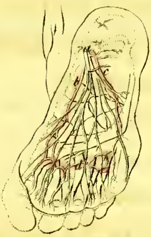


Fig. 3.



V, The tibia.

W, The soleus.

X, The anterior tibial artery.

### NERVES.

*a*, A branch of the first lumbar nerve.

*b*, A branch of the second lumbar nerve.

*c*, The external cutaneous nerve.

*d*, The crural nerve, with its division into the branches which supply the muscles on the fore part of the thigh.

*e*, *e*, The nervus saphenus, sent from the crural nerve to the inner parts of the leg.

*f*, The anterior portion of the obturator nerve.

*g*, Branches of the crural nerve, terminating upon the knee.

*h*, The trunk of the fibular nerve.

*i*, The superficial fibular nerve.

*k*, The deep fibular nerve.

*l*, A branch of the tibial nerve to the outer part of the foot.

## FIG. 2.

### *The Principal* MUSCULAR NERVES *seen in the Back Part of the Inferior Extremity.*

### MUSCLES AND ARTERIES.

A, B, The gluteus maximus. B, Part of the muscle cut from its origin, and turned aside.

C, The gluteus medius.

D, The vastus externus.

E, The obturator internus.

F, The biceps cruris.

G, H, Sections of the semi-tendinosus. Contiguous to G, is a section of the long head of the biceps cruris.

I, The semi-membranosus.

K, The adductor magnus femoris.

L, The gracilis.

M, M, The two heads of the gastrocnemius externus.

N, The tendo Achillis.

O, The popliteus.

P, The flexor longus digitorum pedis.

Q, The flexor longus pollicis pedis.

R, The peroneus longus.

S, The peroneus brevis.

T, The tibialis posticus.

U, The crural artery.

V, The posterior tibial artery.

### NERVES.

*a*, The posterior-superior cutaneous nerve.

*b*, The sciatic nerve, passing out of the cavity of the pelvis.

*c*, The trunk of this nerve, sending branches to the muscles in the back part of the thigh.

*d*, The division of the sciatic nerve into,

*e*, The tibial nerve, and,

*f*, The fibular nerve.

*g*, The fibular nerve, dividing into the superficial and deep fibular nerves.

*h*, The tibial nerve, sending branches to the muscles in the upper and back part of the leg.

*i*, The tibial nerve passing to the sole.

FIG.

# TABLE XXXIV. CONTINUED.

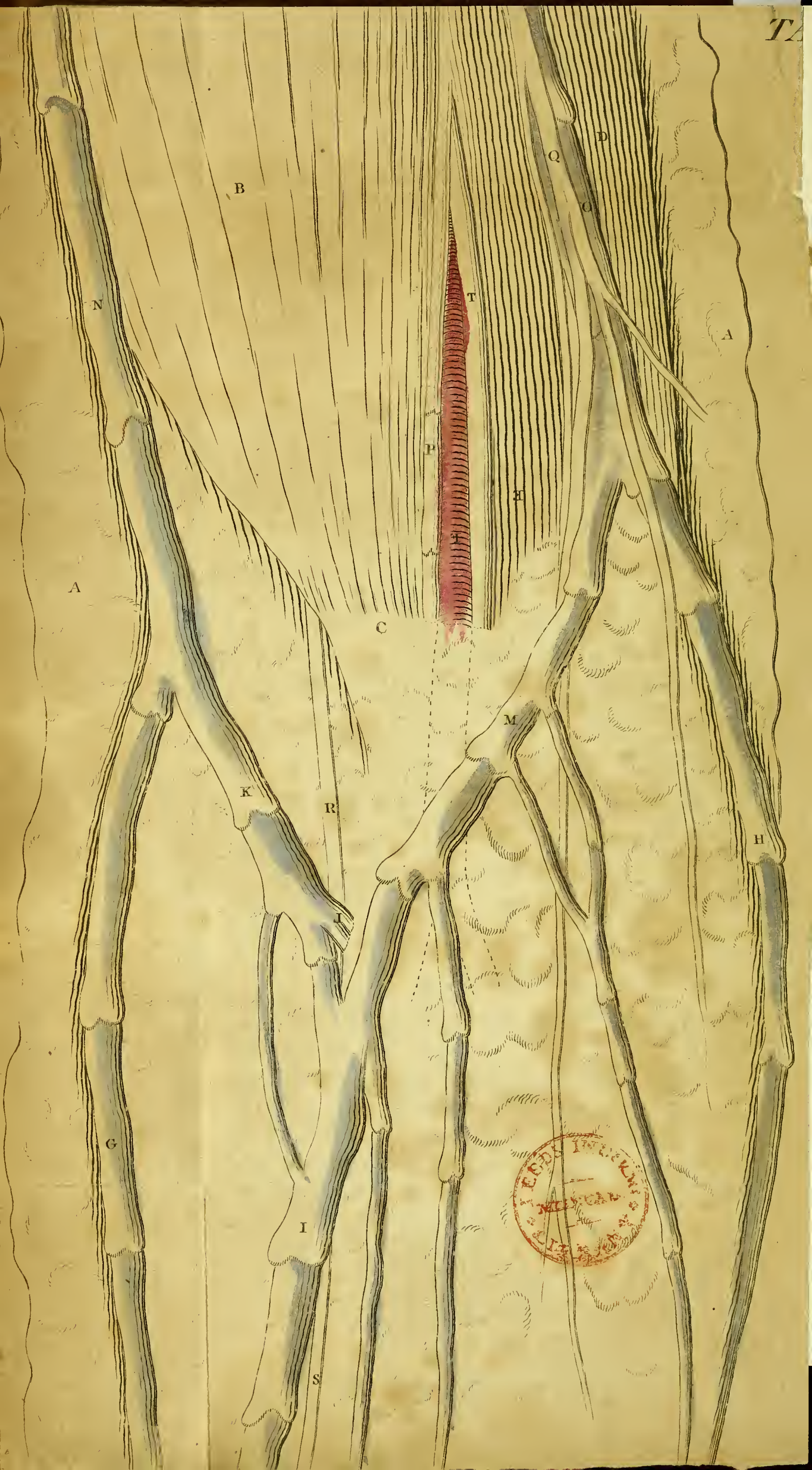
## FIG. 3.

*a*, The division of the tibial nerve into external and internal plantar nerves, and these again into several branches.

*b*, The internal plantar artery.

*c*, The external plantar artery.

*d*, The arch formed by the external plantar artery.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S

# TABLE XXXV.

Represents part of the Muscles, with the Subcutaneous Vessels and Nerve, on the Anterior Part of the Right Joint of the Elbow.

A, A, The integuments cut and reflected from the muscles on the upper arm, and from the fat on the fore arm.
B, The biceps flexor cubiti.
C, The tendon of the biceps.
D, Part of the triceps extensor cubiti.
E, Part of the brachialis internus.
F, The humeral artery.
G, Trunk formed by the deep radial veins.
H, Trunk formed by the deep ulnar veins.
I, The vena mediana longa.
K, The mediana cephalica.
L, A deep vein ending in the median cephalic.
M, The vena mediana basilica, receiving different venæ medianæ longæ minores.
N, The vena cephalica.
O, The vena basilica.
P, A deep humeral vein.
Q, The nervus cutaneus, dividing into branches, some of which pass over the cutaneous veins, and others under them.
R, The nervus musculo-cutaneus, passing under the median cephalic vein.
S, The same nerve descending behind the beginning of the long median vein.

# TABLE XXXVI.

SHEWS the System of the VENA PORTARUM.

*a*, The trunk formed by the inferior mesenteric, splenic, and some of the gastric veins.

*b*, *b*, Branches of the superior mesenteric veins, running nearly in straight lines, where they arise from the intestines.

*c*, *c*, Areolæ, or meshes, of different sizes, formed by these veins.

*d*, *d*, The trunks of the superior mesenteric veins, joining to form,

*e*, The vena portæ abdominalis.

*f*, The vena porta hepatica, where it is about to enter the liver.

*g*, *g*, The branches of the vena portæ, as they are distributed in the substance of the liver.

*h*, *h*, The extreme branches of the vena portæ, where they terminate in the venæ hepaticæ.

TAB. 36

Fig. 1.

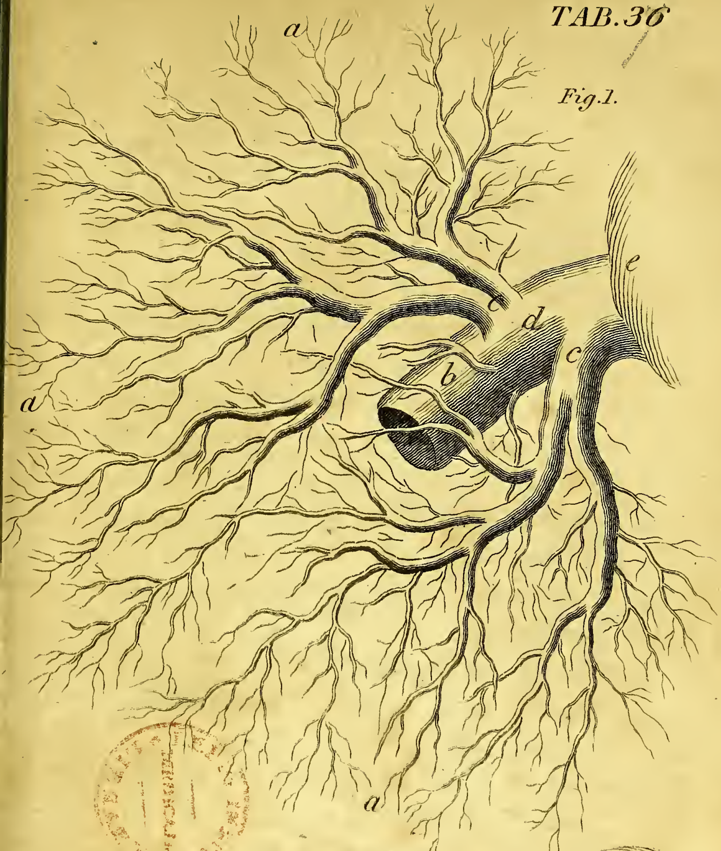
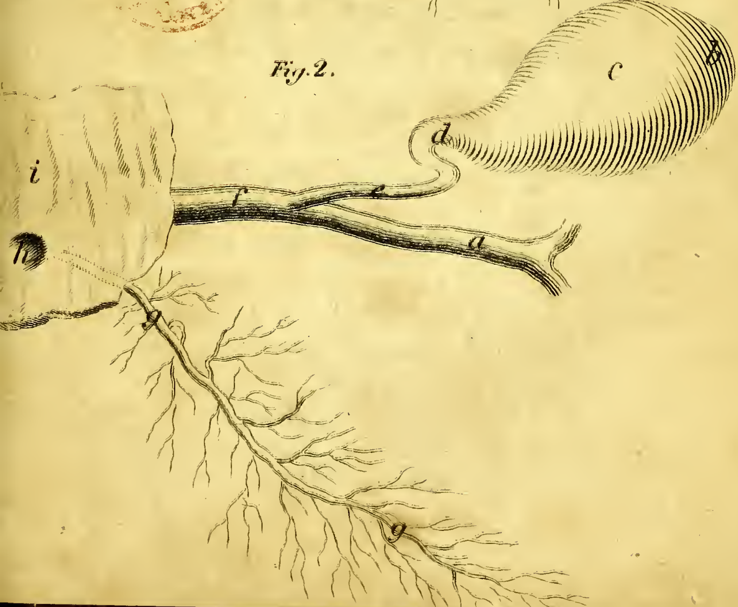
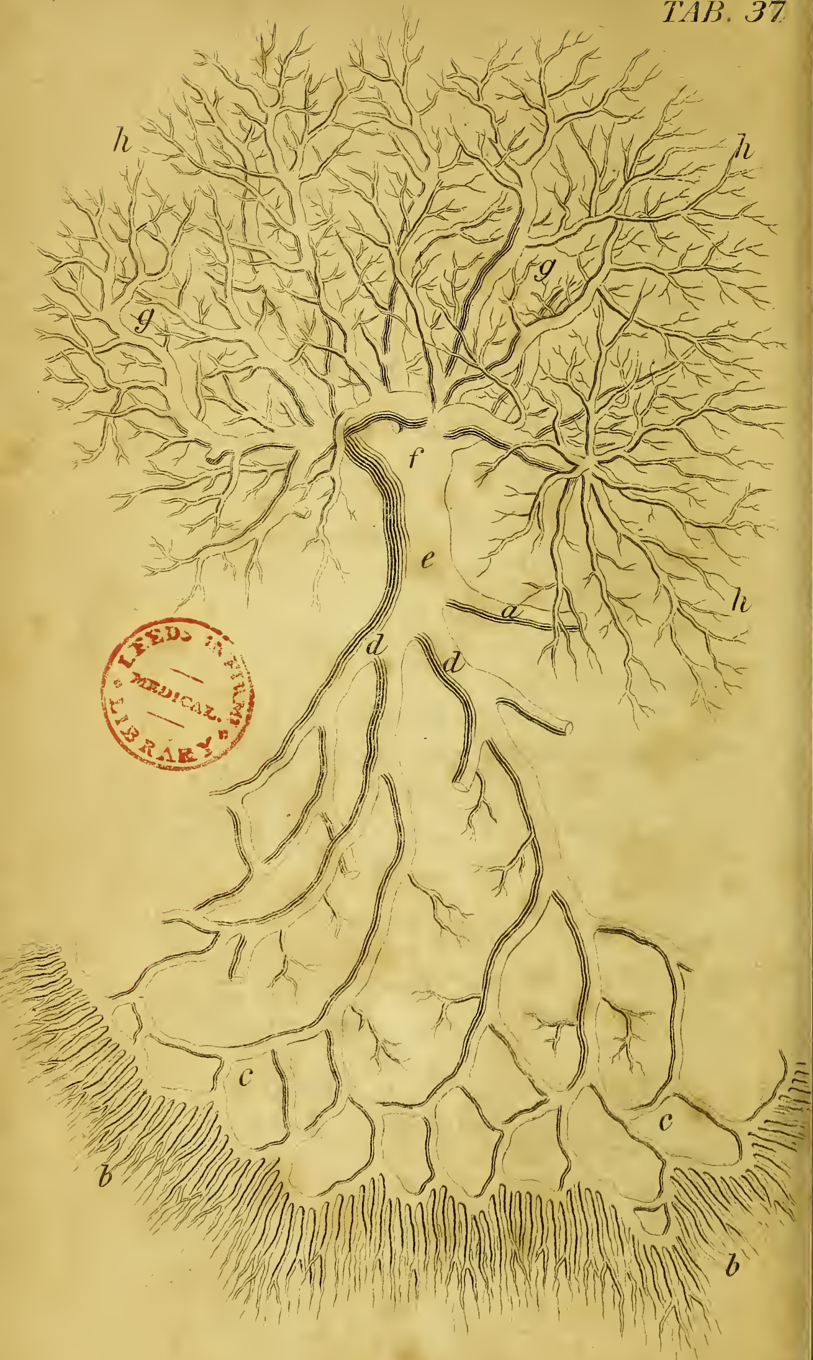


Fig. 2.





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# TABLE XXXVII.

Gives a View of some of the Blood-Vessels of the Liver, and of the Trunks of the Biliary and Pancreatic Ducts.

## FIG. 1.

*Represents the Branches of the* Venæ Hepaticæ, *with their Termination in the* Vena Cava.

*a*, *a*, *a*, The branches of the venæ hepaticæ, where they arise from those of the vena portæ.
*b*, The vena cava inferior.
*c*, *c*, The trunks of the venæ hepaticæ, termed *Venæ Cavæ Hepaticæ*.
*d*, The vena cava inferior, near that part where it perforates the diaphragm, receiving the venæ cavæ hepaticæ.
*e*, Part of the right auricle, with the cava terminating in it.

## FIG. 2.

*Gives a View of the* Gall-Bladder, *with the Termination of the* Biliary *and* Pancreatic Ducts.

*a*, The ductus hepaticus, joined by a branch from the right, and one from the left lobe of the liver.
*b*, The fundus.
*c*, The body, and,
*d*, The cervix of the gall-bladder.

# TABLE XXXVII. CONTINUED.

*e*, The ductus cysticus.

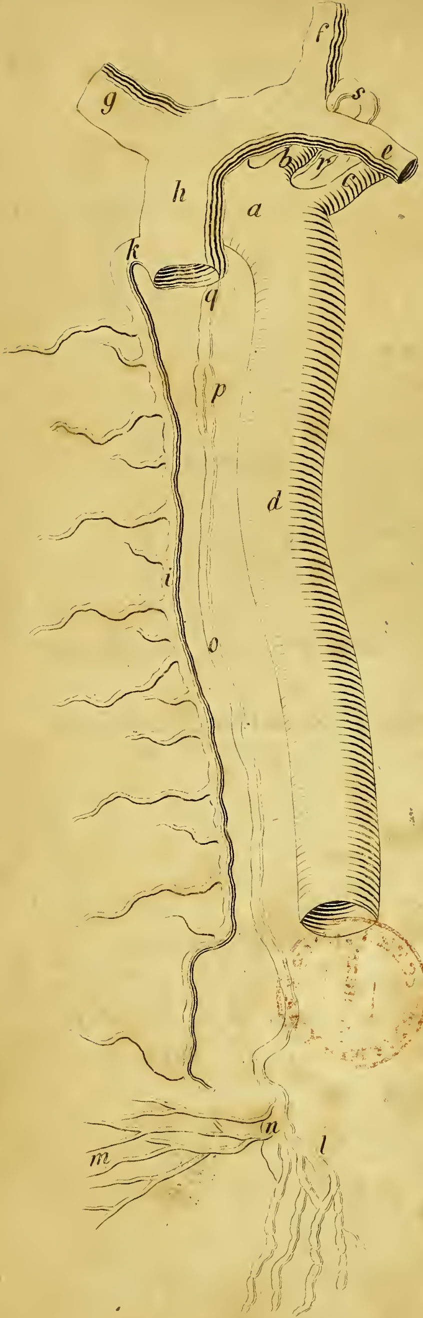
*f*, The ductus communis choledochus.

*g*, *g*, The trunk and branches of the ductus pancreaticus.

*h*, The termination of the ductus communis choledochus, and ductus pancreaticus, in

*i*, The duodenum, which is slit open.

TAB. 38



# TABLE XXXVIII.

EXHIBITS Part of the AORTA, with the VENA CAVA SUPERIOR, VENA AZYGOS, and THORACIC DUCT.

*a*, The arch of the aorta.
*b*, The left carotid, and,
*c*, The left subclavian artery.
*d*, The aorta descendens.
*e*, The left subclavian, and,
*f*, The left internal jugular veins, joining to form the great left subclavian vein.
*g*, The right great subclavian vein.
*h*, The vena cava superior.
*i*, The vena azygos.
*k*, The termination of the vena azygos in the superior vena cava.
*l*, Absorbents of the inferior extremities, pelvis, and loins, and,
*m*, Lacteals entering,
*n*, The receptaculum chyli.
*o*, The thoracic duct.
*p*, A division in this duct.
*q*, The duct passing behind the arch of the aorta.
*r*, Another division of the duct.
*s*, The termination of the duct in the angle formed by the joining of the left subclavian, and left internal jugular veins.

# GLOSSARY.

ABDOMEN, (*abdere*, to hide), the lower venter or belly, containing or hiding the intestines, &c.

ACANTHA, (ακαζω, to sharpen), sometimes used for the spine.

ACETABULUM, (*acetum*, vinegar), the socket for the head of the thigh-bone, resembling an ancient vinegar-cruet.

ACINI, (*acinus*, a grape), the internal structure of several glands.

ACROMION, (ακϱος; the extremity, and ὠμος, the shoulder), a process of the scapula.

ADENOLOGY, (αδην, a gland, and λογος; a discourse), the doctrine of the glands.

ADNATA, (*adnascor*, to grow to), the external coat of the eye.

ALLANTOIS, (αλλας, a gut, and ειδος; shape), a membrane which receives the urine from the bladder in the fœtal quadruped.

ALVEOLI, (*alveus*, a conduit-pipe), the sockets for the teeth.

AMNIOS, (αιμα, blood, αμνιον; a vessel used by the ancients to receive the blood in sacrifices, αμνος, a lamb's skin), the soft membrane immediately surrounding the fœtus.

AMPHYARTHROSIS, (αμφω, both, and αρθρον, articulation), an articulation admitting of an obscure motion.

ANASTOMOSIS, (ανα, through, and στομα, a mouth), the communication of vessels with one another.

ANATOMY, (ανα, through, and τεμνω, to cut), dissection, or that knowledge of animal bodies acquired by dissection.

ANCON, the elbow, (from ασπαζομαι, to embrace), because the bones, being there united, are folded one into another. Hence also,

ANCONEUS, a muscle situated there, and,

ANCONOID, a process of the cubit, from αγκων, the elbow, and ειδος, shape.

ANGIOLOGY, (αγγειον, a vessel, and λογος, a discourse), a description of the vessels.

ANTAGONIST, (αντι, against, and αγων, a struggle), an epithet of a muscle acting contrary to another.

ANTIHELIX, (αντι, against, and ειλω, to turn about), the external part of the ear opposite to the helix.

ANTITHENOR, (αντι, against, and θεναρ, the palm of the hand), one of the muscles extending the thumb.

ANTITRAGUS, (αντι, against, and τραγος, a goat), a prominence of the ear opposite to the tragus.

ANUS, (a contraction of *Annulus*, a little ring), the extremity of the rectum, so called from its circular fibres.

AORTA, (αορτη, a vessel), the great artery of the heart.

APONEUROSIS, (απο, from, and νευρον, a nerve), a tendinous expansion, supposed by the ancients to be that of a nerve.

APOPHYSIS, (αποφυω, to spring from), the process of a bone, and a part of the same bone. EPIPHYSIS, a process attached to a bone, and not a part of the same bone.

ARACHNOIDES, (αραχνης, a spider, and ειδος, likeness), a cob-web like membrane, one of the coats of the brain and eye.

ARTERIA, (αηρ, air, and τηρεω, to keep), because the ancients thought that only air was contained in the arteries.

ARTHRODIA, (αρθρον, a joint), that kind of articulation which is shallow.

ARYTENOIDES, (αρυταινα, a ewer, and ειδος, shape), two cartilages of the larynx.

ASPERA ARTERIA, (*asper*, rough, and *arteria*, an air-vessel), the trachea or wind-pipe.

ASTRAGALUS, (αστράγαλος, a die), a bone of the tarsus resembling an ancient die.

ATLAS, (ατλαω, to sustain), the first of the cervical vertebræ, so named from supporting the head, as Atlas was supposed to support the world.

AZYGOS, (α, priv. and ζυγος, a yoke), a term applied to any part, not having a corresponding part.

### B.

BASILICA, (βασιλευς, a king), an epithet, by way of eminence, given to one of the veins of the arm.

BICEPS, (*bis*, twice, and *caput*, a head), composed of two heads.

BRACHIUM, (βραχυς, short), because, in general, from the shoulder to the hand is shorter than from the hip to the foot.

BREGMA, (βρεχω, to moisten), the opening of the head in the course of the sagittal suture, found in the heads of new-born children.

BRONCHIA, (βρογχος, the throat), the ramifications of the trachea.

BUCCINATOR, (a trumpeter), a muscle of the cheek, much used by trumpeters.

BURSALOGY, (βυρσα, a purse, and λογος, a discourse), a description of the bursæ mucosæ.

### C.

CALCANEUM, (*calx*, the heel), the name of the os calcis.

CALVARIA, or CALVA, (*calvus*, bald), the upper part of the cranium, which turns first bald.

CANCELLI, (lettice-work), the reticular substance in bones.

CAPILLARY VESSELS, (*capillus*, a little hair), the small ramifications of the arteries.

CAPUT GALLINAGINIS, (a wood-cock's head), a little eminence at the termination of the seminal vessels of the penis.

CARDIA, (καρδια, the heart), the superior opening of the stomach, so called from being situated near the heart.

CAROTID, (καροω, to induce sleep), arteries of the head and neck, which if tied, the animal becomes comatose, or are said to cause the appearance of being asleep.

CARPUS, (καρπος), the wrist.

CARTILAGE, a matter softer than bone, but harder than ligament.

CEPHALIC VEIN, (κεφαλη, the head), the ancients being accustomed to open this vein in disorders of the head.

CERATOGLOSSUS, (κερας, a horn, and γλοττα, a tongue), a muscle running from one of the cornua of the os hyoides to the tongue.

CEREBELLUM, dim. of CEREBRUM, the brain, (καρη, the head).

CERVIX, the hinder part of the neck, the fore part being called COLLUM.

CHIRURGERY, (χειρ, the hand, and εργον, work), the profession of a surgeon.

CHOLEDOCHUS DUCTUS, (χολη, bile, and δεχομαι, to receive), the common bile-duct.

CHORION, (χωριον, domicilium), the outer membrane involving the fœtus; or χορος, a chorus, this membrane being supplied with many blood-vessels in the quadruped.

CHOROIDES, so called on account of its many blood-vessels, resembling the chorion.

CLAVICULA, (dim. of *clavis*, a key), the clavicle or collar-bone; so called from its resemblance to an ancient key.

CLINOID, (κλινη, a bed, and ειδος, shape), processes of the sella Turcica of the sphenoid bone, so called from their resemblance to a couch.

CLITORIS, (κλείω, to conceal), a part of the female pudendum concealed by the labia majora.

COCCYX, (κοκκυξ, a cuckoo), the lower end of the spina dorsi, so called from its resemblance to the beak of that bird.

CŒLIACA, (κοιλια, the belly), the name of an artery in the abdomen.

COLON, (κοιλος, hollow), the first of the large intestines.

CONDYLE, (κονδυλος, a joint, a knuckle, a knot), an eminence in several of the joints.

CONGLOBATE, (*conglobatus*, gathered together in a circle), a gland subsisting by itself, like those of the absorbent system.

CONGLOMERATE, (*conglomeratus*, heaped together), a gland composed of various glands.

CORACO, names compounded with this word belong to muscles which are attached to the coracoid process of the scapula.

CORACOID, (κοραξ, a crow, and ειδος, resemblance), like the beak of a crow.

CORONARY, (*corona*, a crown), vessels so called from surrounding the parts like a crown.

**CORONOID,** (κορωνη, a crow, and ειδος, shape), a process shaped like a crow's beak.

**CORPUS CALLOSUM,** (*corpus*, a body, and *callus*, hard), part of the medullary substance of the brain, supposed to be firmer than the rest.

**CORTICALIS SUBSTANTIA,** (*cortex*, bark), the cortical substance of the brain.

**COSTÆ,** (*custodio*, to guard), the ribs, because they guard the heart, &c.

**COTYLOID,** (κοτυλη, an old measure, and ειδος, shape), the cavity for receiving the head of the thigh-bone, resembling the rotuli.

**CRANIUM,** (κρανιον, the skull, quasi κερανιον, from κερα, the head).

**CREMASTER,** (κρεμαω, to suspend), a muscle so called, because it suspends the testicle.

**CRIBRIFORM,** (*cribrum*, a sieve), perforated like a sieve.

**CRICOID,** (κρικος, a ring, and ειδος, shape), annular.

**CRISTA GALLI,** a portion of the ethmoid bone, so called from its resemblanee to a cock's comb.

**CROTOPHITE,** (κροταφος, the temple), the temporal muscle.

**CRURA,** (*crus*, a leg), applied to some parts, from their resemblance to a leg or root.

**CUBITUS,** (a *cubando*), that part of the arm from the elbow to the wrist; because the ancients, during meals, used to recline upon it.

**CUBOIDES,** (κυβος, a cube, and ειδος, shape), a bone of the foot resembling a cube.

CUCULLARIS, (*cucullus*, a cowl or hood), the first muscle of the scapula, so called from its shape.

CUNEIFORM, (*cuneus*, a wedge), wedge-shaped.

CUTICULA, (the dim. of *cutis*, the skin), the scarf-skin.

CUTIS, the skin.

CYSTICUS DUCTUS, (κυστις, a bladder, *ductus*, a duct), the duct leading from the gall-bladder.

## D.

DARTOS, (δερω, to excoriate), an imaginary muscle of the scrotum.

DELTOID, (Δελτα, the fourth letter of the Greek alphabet, and ειδος, shape), resembling the Greek letter Δ.

DIAPHRAGM, (διαφρασσω, to divide), the transverse muscle which separates the thorax from the abdomen.

DIASTOLE, (διαστέλλω, to send through), the dilatation of the heart, auricles, and arteries, opposed to SYSTOLE, the contraction of the same parts.

DIARTHROSIS, (διαρθροω, to articulate), a moveable connection of bones.

DIGASTRIC, (δις, twice, and γαστηρ, a belly), having two bellies.

DIPLOE, (διπλοω, to double), the spongy substance between the two tables of the skull.

DODECADACTYLON, (δωδεκα, twelve, and δακτυλοι, fingers), a name of the

DUODENUM, (*duodenus*, consisting of twelve, viz. inches),

inches), the first portion of the small intestines, so called from its general length.

DURA MATER, (*durus*, hard, and *mater*, a mother), the outermost membrane of the brain; the ancients finding it harder than, and supposing it to give origin to, the other membranes of the body.

## E.

EMBRYO, (εμβρυω, to sprout out), the child in the womb before the fourth month, after which it is called Fœtus.

EMULGENTS, (*emulgo*, to milk out), the arteries and veins of the kidneys, so called because, according to the ancients, they strained, and, as it were, milked the serum through the kidneys.

EMUNCTORES, (*emungo*, to wipe away), glands, which, according to the ancients, received the excrementitious matter from the noble parts, as the parotids from the brain, the axillary glands from the heart, and inguinal glands from the liver.

ENARTHROSIS, (εν, in, and αρθρον, a joint), an articulation of bones, the same as *Arthrosis.*

ENCEPHALON, (εγκεφαλος), the brain.

ENTERIC, (εντερον, an intestine), belonging to the intestines.

EPIDERMIS, (επι, upon, and δερμα, the skin), the scarf-skin.

EPIDIDYMIS, (επι, upon, and διδυμος, twins, the testicles), the small oblong body which lies above the testicle.

EPIGASTRIC, (επι, upon, and γαστηρ, the belly), the superior part of the abdomen.

EPIGLOTTIS, (επι, upon, and γλωττα, the tongue), one of the five cartilages of the larynx, situated about the glottis.

EPIPHIPPIUM, (επι, upon, and ιππος, a horse), part of the os sphenoides, so called from its resemblance to a saddle.

EPIPHYSIS, (επι, upon, and φυω, to grow), *see* APOPHYSIS.

EPIPLOON, (επι, upon, and πλεω, to sail), the omentum, or that membranous viscus of the abdomen which covers the intestines, and hangs from the bottom of the stomach.

EPISTROPHÆUS, (επιστροφεω, to turn about), the second cervical vertebra,—the head is turned upon it.

ESOPHAGUS, (οιω, to carry, φαγω, to eat), the canal leading from the pharynx to the stomach, carrying what is swallowed into the stomach.

ETHMOID, (εθμος, a sieve), so called because it is perforated like a sieve.

## F.

FALCIFORM, (*falx*, a scythe), shaped like a scythe.

FASCIA, (*fascis*, a bundle), an expansion of a muscle, inclosing others like a band.

FAUCES, (the plural of *faux)*, the top of the throat.

FIBULA, (a clasp), the lesser bone of the leg, which is thus named from being placed opposite to the part where the knee-buckle or clasp was formerly used.

FŒTUS, the child in the womb past the third month, and fully formed.

## G.

GALACTOPHEROUS, (γαλα, milk, and φερω, to carry), conveying the milk.

GANGLION, a knot in the course of a nerve.

GASTROCNEMIUS, (γαστηρ, the belly, and κνημη, the leg), the muscle forming the thick of the leg.

GASTRO-EPIPLOIC, (γαστηρ, the stomach, and επιπλοον, the caul), belonging to the stomach and omentum.

GENIO, (γενειον, the chin), names compounded with this word belong to muscles attached to the chin.

GINGLYMUS, (γιγγλυμος, a hinge), articulation admitting flexion and extension.

GLANDULA, (dim. of GLANS, a nut or acron).

GLENOID, (γληνη, a cavity), a part having a shallow cavity.

GLOMER, a convoluted bundle of glands.

GLOSSO, (γλωσσα, the tongue), names compounded with this word are applied to muscles attached to the tongue.

GLOTTIS, (γλοττα, the tongue), the superior opening of the larynx at the root of the tongue.

GLUTEUS, (γλουτος, the buttock), muscles forming part of the buttocks.

GOMPHOSIS, γομφοω, to drive in a nail), an articulation of bones, like a nail in a piece of wood.

H.

## H.

HARMONIA, (αρμονα, to fit together), a species of immoveable articulation.

HELIX, (ειλω, to turn about), the outer bar or margin of the external ear.

HYALOID, (υαλος, glass), the capsule of the vitreous humour of the eye, so called from its glassy appearance.

HYMEN, (the god of marriage), the membrane situated at the entrance of the virgin vagina.

HYO, names compounded with this word belong to muscles which are attached to the

HYOIDES OS, (υ, and ειδος, shape), a bone of the tongue resembling the Greek υ (upsilon).

HYPOCHONDRIUM, (υπο, under, and χονδρος, a cartilage), the upper region of the abdomen, next the cartilages of the ribs.

HYPOGASTRIC, (υπο, under, and γαστηρ, the belly), the lower region of the fore part of the abdomen.

HYPOGLOSSIS, (υπο, under, and γλωσσα, the tongue), parts which lie under the tongue, called also *Ranularis.*

HYPOTHENAR, (υπο, under, and θεναρ, the palm of the hand), one of the muscles contracting the thumb.

## I.

JEJUNUM, (empty), one of the intestines, so called from being generally found empty.

**ILEUM**, (ειλω, to turn), a portion of the small intestines, so called from being found convoluted.

**INCISORES**, (*incidere*, to cut), the fore-teeth.

**INCUS**, (an anvil), a small bone of the internal ear, with which the malleus is articulated.

**INDEX**, (*indico*, to point out), the fore-finger.

**INNOMINATUM**, parts which have no proper name.

**INTERFEMINEUM**, *vide* PERINEUM.

**IRIS**, (the rain-bow), the circle round the pupil of the eye, deriving its name from its various colours.

**ISCHIUM**, (ισχυω, to support), that part of the os innominatum upon which we sit.

**JUGALE OS**, the zygoma.

## L.

**LACUNÆ**, (little cavities), the excretory ducts of the urethra, vagina, &c.

**LAMBDOIDAL**, resembling the Greek Λ (lambda).

**LAMINA**, a scale or plate. It is used for the tables of the skull.

**LARYNX**, the superior part of the trachea.

**LINEA ALBA**, a white line formed by the meeting of the tendons of the abdominal muscles.

**LUMBRICALES**, (*lumbricus*, a worm), four muscles of the hand and foot.

## M.

**MASSETER**, (μασσαομαι, to chew), a muscle which assists in chewing.

MASTOID, (μαϛος, a breast), shaped like a nipple or breast.

MAXILLA, (μασσαω, to chew), the jaw.

MEDIANA VENA, the middle vein of the arm, between the basilic and cephalic.

MEDIASTINUM, (*medium*, the middle), the production of the pleura, which divides the thorax into two cavities. MEDIASTINUM CEREBRI, a process of the dura mater, which lies between the two hemispheres of the brain.

MENINGES, the dura and pia mater.

MESENTERY, (μεσος, the middle, and εντερον, the intestine), the membrane in the middle of the intestines, by which they are attached.

MESERAIC, (μεσος, the middle, and αραια, the belly), the same as the last article.

MESOCOLON, (μεσος, the middle, and κόλον, the colon), that part of the mesentery in the middle of the colon.

METACARPUS, (μετα, after, and καρπος, the wrist), that part of the hand between the carpus and fingers.

METATARSUS, (μετα, after, and ταρσος, the tarsus), that part of the foot between the tarsus and toes.

MITRALIS VALVULA, (*mitra*, a mitre), valves at the left ventricle of the heart, like a mitre.

MYLO, (μυλη, a grinder-tooth), names compounded of this word belong to muscles that are attached near the grinders.

MYOIDES PLATYSMA, a muscular expansion on the neck. *See* PLATYSMA.

MYOLOGY, the doctrine of the muscles.

## N.

**NAVICULARE**, (*navicula*, a small boat), a bone of the carpus, and also of the tarsus.

**NEUROLOGY**, the doctrine of the nerves.

**NYMPHÆ**, a semicircular glandular membrane in the *pudendum muliebre*, so called because it directs the course of the urine.

## O.

**ODONTOIDES**, (οδους, a tooth, and ειδος, shape), tooth-like.

**OLECRANON**, (ωλενη, the cubit, and κρανον, the head), the elbow, or head of the ulna.

**OMENTUM**, (*omen*, a guess), an abdominal viscus, so called because the ancient priests pretended to reveal the secrets of heaven by inspecting this viscus.

**OMO**, (ωμος, the shoulder), names compounded of this word belong to muscles attached to the scapula.

**OMO-PLATA**, (ωμος, the shoulder, and πλατυς, broad), the scapula or shoulder-blade.

**OSTEOLOGY**, the doctrine of the bones.

## P.

**PANCREAS**, (παν, all, and κρεας, flesh), a gland of the abdomen.

**PARENCHYMA**, (παρεγχεω, to pour through), a substance

stance connecting the vessels, &c. of the lungs, liver, &c.

PARIETALIA, *(paries*, a wall), bones of the cranium, serving as a wall to the encephalon.

PAROTID, (παρα, near, and ωτος, the gen. of ȣς, the ear, a gland situated near the ear.

PATELLA, (dim. of *patina*, a pan), the knee-pan.

PATHETICA, (παθος, passion), the fourth pair of nerves, because, by means of these, the eyes express certain passions of the mind.

PELVIS, (πελυξ, a bason), the bason of the kidneys, or the lower part of the abdomen, in which the bladder (and in women the uterus) and rectum are contained.

PERICARDIUM, (περι, around, and καρδια, the heart), the membrane surrounding the heart.

PERICRANIUM, (περι, around, and κρανιον, the cranium), the membrane covering the bones of the cranium.

PERINEUM, (περινεω, to flow round, because that part is generally moist), the space between the external parts of generation and the anus. It is sometimes called INTERFEMINEUM, *(inter*, between, and *femen*, the inside of the thigh).

PERIOSTEUM, (περι, around, and οστεον, a bone), the membrane surrounding the bones.

PERISTALTIC, (περιϛελλω, to contract), the motion of the intestines.

PERITONEUM, (περιτεινω, to extend round), the membrane lining the abdomen, and covering its viscera.

PETROSUM OS, (πετρα, a rock), part of the temporal bone.

PHALANX, (an army), the bones of the fingers and toes are called phalanges, from their regularity.

PHARYNX, (φερειν, to convey, because it conveys the food into the stomach), a membranous bag at the back end of the mouth.

PHRENIC, (φρενες, the diaphragm, φρην, the mind, because the diaphragm was supposed to be the seat of the mind), the name of a nerve.

PHYSIOLOGY, (φυσις, nature), an account of the actions and functions of an animated body.

PIA MATER, the innermost membrane around the brain.

PLACENTA, (πλακως, a cake), the after-birth.

PLANTARIS, (*planta*, the sole), parts situated in the sole.

PLATYSMA-MYOIDES, (πλατυς, broad, μυων, a muscle, and ειδος, shape), a muscle of the neck.

PLEURA, (πλευρα, the side), the membrane lining the cavity of the thorax.

PLEXUS, (*plecto*, to weave together), a kind of network of blood-vessels or nerves.

POPLITEUS, (*poples*, the ham), a muscle of the leg.

PREPUCE, (*præputo*, to cut off before), the foreskin of the penis, which the eastern nations generally cut off.

PROCESSUS, (*procedo*, to start out), a protuberance of a bone.

PROSTATÆ, (προ, before, and ιστημι, to stand), a gland situated before the *vesiculæ seminales*, PSOAS, (ψοα, the loin), a muscle so named from its situation.

PTERYGOID, (πτεϱα, a wing), a process resembling a wing.

PTERYGO-STAPHALINI, (πτεϱυξ, a wing, and σταφυλη, the palate), muscles arising from the pterygoid process of the os sphenoides, and inserted into the uvula.

PUDENDA, (*pudor*, shame), the parts of generation.

PUPILLA, (a little puppet), the round aperture in the iris of the eye.

PYLORUS, (πυλωϱος, the keeper of a gate), the lower orifice of the stomach, guarding the entrance of the bowels.

PYRAMIDALIS, shaped like a pyramid.

## R.

RADIUS, (the spoke of a wheel), the small bone of the fore-arm.

RANULAR, like a frog or toad.

RAPHE, (ϱαπτω, to sew), a suture.

RECTUM, the straight gut, the last of the intestines.

RENES, (ϱεω, to flow), the kidneys, through which the urine flows.

RETINA, (*rete*, a net), the net-like expansion of the optic nerve on the inner surface of the eye.

RHOMBOIDES, a muscle so called from resembling a geometrical figure (ϱομβος), whose sides are equal, but not right angled.

ROTULA, (dim. of *rota*, a wheel), the knee-pan.

## S.

SACRUM, (sacred), a bone so called, because it was offered in sacrifice.

SAGITTALIS, (*sagitta*, an arrow), a suture in the cranium.

SALVATELLA, (*salvo*, to preserve), a vein of the foot, the opening of which was said to preserve health, and to cure melancholy.

SANGUIS, (σαειν, to preserve), the blood.

SAPHENA, (σαφος, manifest), a vein of the leg.

SARTORIUS, (*sartor*, a tailor), the muscle by means of which the tailor lays his legs across.

SCALENI, (σκαληνός, a geometrical figure with three unequal sides), muscles of the neck.

SCAPHA, (a little boat), the depression of the outer ear before the antihelix.

SCAPHOIDES, (resembling a boat), a bone of the carpus, and also of the tarsus.

SCAPULA, the shoulder-blade.

SCELETUS, (σκελλω, to dry), a skeleton.

SCLEROTIC, (σκληρος, hard), the outermost or hardest membrane of the eye.

SCUTIFORM, shaped like a shield.

SELLA TURCICA, SELLA EQUINA, SELLA SPHENOIDES, are various names for a part of the sphenoid bone resembling a Turkish saddle.

SEPTUM CORDIS, (*sepes*, a hedge), the fleshy substance which divides the right and left ventricles of the heart.

SESAMOID, (σεσαμη, an Indian bean), small bones in the hands and feet resembling the *semen sesami.*

SIGMOID, resembling the Greek Σ (sigma).

SPHENOID, (σφην, a wedge), shaped like a wedge.

SPHINCTER, (σφιγγω, to shut up), the name of several muscles, whose office it is to shut up the apertures around which they are placed.

SPLANCHNOLOGY, (σπλαχνον, an entrail), the doctrine of the viscera.

SQUAMOUS, (*squama*, a scale), covering as the scales of fishes do each other.

STAPES, (a stirrup), one of the small bones of the internal ear.

STOMACHUS, (στομα, a mouth, and χεω, to pour), the stomach, or upper orifice of the ventricle.

STYLOID, (*stylus*, a pencil), a process like a pencil on the temporal bone.

SYMPHYSIS, (συμφυω, to draw together), the connection of bones which have no manifest motion.

SYNARTHROSIS, (συν, with, and αρθρον, a joint), articulation without manifest motion.

SYNCHONDROSIS, (συν, with, and χονδρος, a cartilage), articulation by means of intervening cartilage.

SYNDESMOLOGY, (συνδεσμος, a ligament), the doctrine of ligaments.

SYNDESMOSIS, the connection of bones by ligaments.

SYNEUROSIS, (συν, with, and νευρον, a nerve), the connection of bones by tendon, formerly mistaken for nerve.

SYNTHESIS, (συντιθημι, to put together), the anatomical connection of the bones of the skeleton.

SYSSARCOSIS, (συν, with, and σαρξ, flesh), the connection of bones by muscle.

SYSTOLE, (συστελλω, to contract), *vide* DIASTOLE.

## T.

TALUS, (a die), a bone of the heel.

TARSUS, the space between the bones of the leg and the metatarsus.

TENDON, (τεινω, to extend), the extremity of a muscle.

TERES, (round), the name of a muscle.

TESTIS, (a witness, *quia est quasi testis virilitatis)*, the testicle.

THECA, (τιθημι, to put), the spinal canal is sometimes called Theca Vertebralis.

THENAR, (the palm of the hand), a muscle extending the thumb.

THORAX, (θορεω, to leap), the chest in which the heart leaps or beats.

THYMUS, *(thymus)*, a temporary gland in the thorax.

THYRO, names compounded with this word belong to muscles which are attached to the

THYROID, (θυρος, a shield), cartilage, shaped like a shield.

TIBIA, (a pipe), the great bone of the leg.

TONSIL, the round glands placed between the arches of the palate.

TRACHEA, (τραχυς, rough), the wind-pipe.

TRAGUS, (a goat), a small eminence of the external ear, upon which hair often grows like the beard of a goat.

TRAPEZOID, (*τραπεξυον*, a four-sided figure), like a trapezium.

TROCHANTER, (*τριχαω*, to run or to roll), a process of the thigh-bone, the muscles inserted into which perform the office of running.

TROCHLEA, (*τροχος*, a wheel), a kind of cartilaginous pulley.

TROCHLEARIS, an articulation where one part moves round another like a pulley.

TUBÆ FALLOPIANÆ, two passages in the womb like trumpets, described by FALLOPIUS.

TYMPANUM, the drum of the ear.

## U.

ULNA, (*ωλενη*, the cubit), the large bone of the arm.

UMBILICUS, (*umbo ilium*, the middle of the loins), the navel.

URACHUS, (*ȣρον*, urine, and *χεω*, to pour), a ligament of the bladder, occupying the place of the urinary passage of the fœtal quadruped, which goes into the allantois.

URETER, (*ȣρος*, urine), the canal that carries the urine off from the kidney into the bladder.

URETHRA, the passage for the urine from the bladder.

UVEA, (*uva*, a grape), the posterior lamina of the iris.

UVULA, the glandular substance which hangs down from the middle of the soft palate.

VALVES, (*valvæ*, folding doors), little membranes preventing the return of the fluids in the blood-vessels and absorbents.

VERTEBRÆ, (*verto*, to turn), the bones of the spine.

VOMER, (a plough-share), a bone of the nose.

## X.

XIPHOID, (ξιφος, a sword), like a sword.

## Z.

ZYGOMA, (ζογος, a yoke), the cavity under the zygomatic process of the temporal bone.

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